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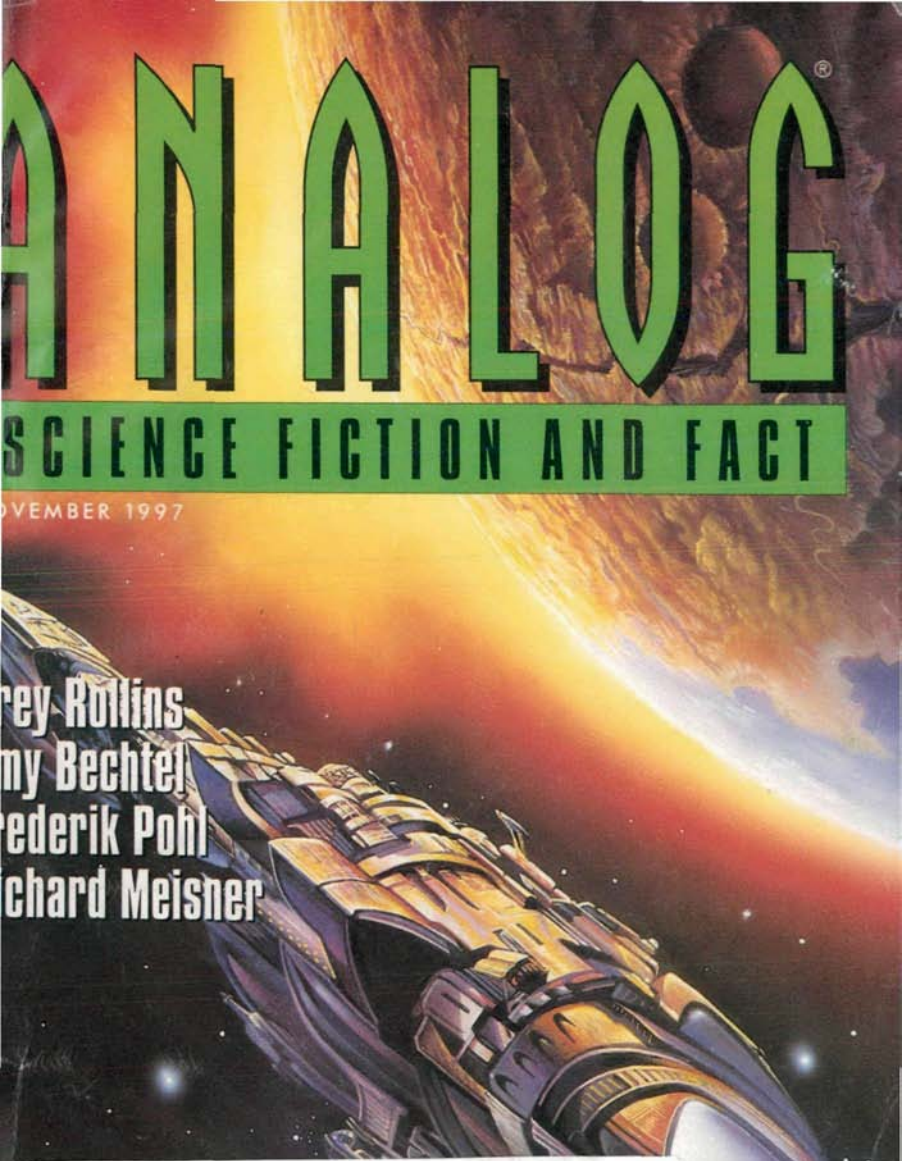

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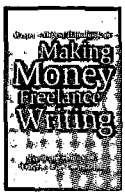

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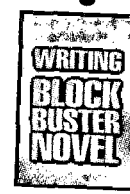

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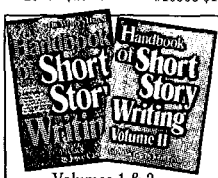

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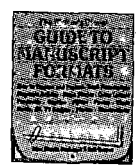

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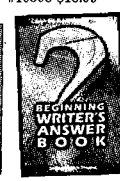

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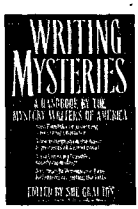

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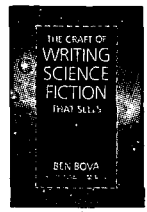

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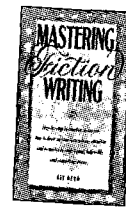

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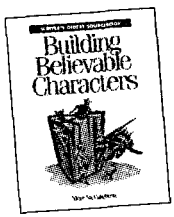

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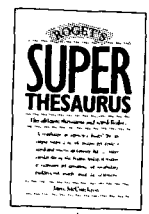

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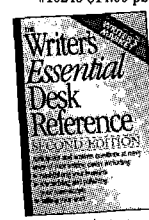

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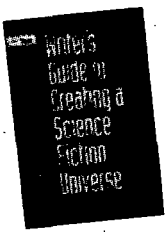

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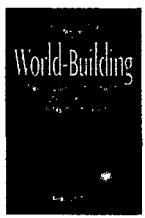

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SCIENCE FICTION AND FACT

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Vol. CXVII No. 11
November 1997

Next Issue on Sale
October 21, 1997

Serial

O PIONEER! (Part Two of Three), Frederik Pohl ____ 14

Novelettes

TRIAL BY ORDEAL, Grey Rollins ____ 104
NO MORE TO THE DANCE, Amy Bechtel ____ 126

Science Fact

COSMOLOGICAL DARWINISM, Richard Meisner ____ 82

Short Stories

LAST EXIT BEFORE THE FINAL FRONTIER, Jeffery D. Kooistra ____ 68
WWW: THE WEB WE WOVE, Arlan Andrews, Sr. ____ 96

Probability Zero

SUFFICIENTLY UN-ADVANCED, Mark Rich ____ 93

Reader's Departments

THE EDITOR'S PAGE ____ 4
THE REFERENCE LIBRARY, Tom Easton ____ 147
IN TIMES TO COME ____ 154
BRASS TACKS ____ 155
UPCOMING EVENTS, Anthony Lewis ____ 160

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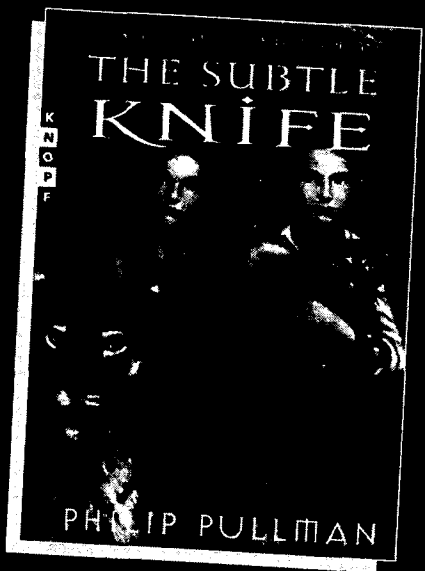

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EDITORIAL Stanley Schmidt

THE BIG BAD BAG BUG

For several months before writing this, I've been watching the widespread controversy over automobile air bags. Do they save more lives than they end? Are they dangerous when properly used, or only when people ignore the instructions? Should people be able to disable them, or hire someone else to disable them, if they want to?

A safety device that sometimes kills the people it's supposed to protect is a novel and fascinating concept in itself. But the real significance of the great air bag debate—and much of what has been said and done (or not done) about it—may be as a symptom of a much bigger and more pervasive problem in our culture.

An air bag, as you probably know, is an inflatable cushion stored out of sight in front of the driver or front-seat passenger in a car. If the car runs into something, the impact triggers a mechanism that causes the bag to inflate—rapidly—and prevent the occupant behind it from being hurled into steering column, dashboard, or windshield. It then deflates, almost immediately, once the brief but intense danger is past.

It sounds so good that air bags originally were sold only as an extra-price option on luxury cars—and they sold well. Now they've become standard equipment on most cars, and they will be required by law in all cars manufactured in or after 1998.

The National Highway Traffic Safety Administration (NHTSA) is convinced that this is a Good Thing. As of this writing, they claim, and I have no reason to doubt them, that air bags have saved more than 1,600 lives since 1986. However, the picture is not as clearly rosy as it first looked. Air bags have also been found responsible for killing more than thirty children and twenty adults.

How can this be? Well, auto accidents happen *fast*, so to be effective, air bags must inflate fast. Current models inflate at up to 200 miles per hour. At speeds like that, why don't they *always* kill or maim the people they're supposed to be protecting?

Because the people are not supposed to be in the way when they're moving that fast. An inflating air bag starts from rest, accelerates, and then decelerates, coming to rest before it begins deflating. The assumption that air bags save lives depends on their being used in conjunction with seat belts, which hold the driver or passenger far enough back that the air

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TECHNOLOGY UPDATE

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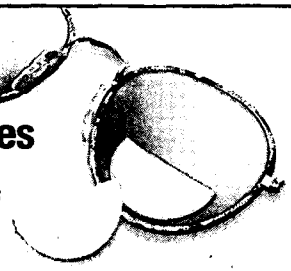

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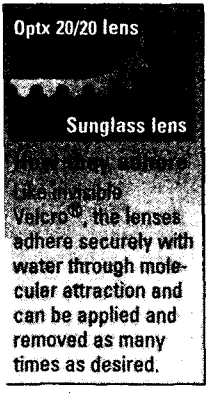
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bag can't reach them until it's well into its slowing-down phase.

The reports I've seen agree that most of the people killed or injured by air bags have not been wearing seat belts. Under those conditions, an impact hurls the air bag *back* and the passenger *forward*, both at considerable speed, so they collide at even greater speed. This observation seriously weakens the increasingly fashionable argument that air bags are "dangerous." If you know how they work, and you insist on sitting behind something that will inflate that fast, and you don't wear the other gadget that's intended to keep you out of its way, a very good argument can be made that you're killed not by your air bag, but by your own stupidity (or ignorance).

However, it's not quite that simple, either. Some victims of air bags *were* wearing their seat belts. This clearly says that not everything is entirely peachy. If you're doing everything right, and the very thing that's supposed to protect you does more damage than what it was supposed to protect you from, you have every right to question whether that "safety device" is more asset or liability.

From a strict, simpleminded statistical standpoint, it could be argued that the odds are pretty good even based on the total record so far. If you have 1,650 cases in which somebody would have been killed without air bags, and air bags prevented 1,600 of those deaths but contributed to fifty, they have clearly done much more good than harm. But that's little consolation if you're one of the fifty (or their survivors)—especially if there's doubt that your accident would have been fatal *without* the air bag. And especially if a closer look shows that the risk/benefit ratio is different for different identifiable groups of people.

Which it does. Most of the deaths and injuries attributed to air bags have involved children and short women. A short person necessarily drives with the seat farther forward than a tall one. Thus the air bag doesn't have to travel as far to hit them, and will do so at an earlier—and faster—stage of its travel. For a short person, therefore, an air bag really may be more of a danger than a protection.

In any case, there is room for disagreement about which risk is preferable—to air-bag or not to air-bag, to paraphrase Shakespeare—and reason to believe that the answer is not the same for all people. There is talk among auto manufacturers about find-

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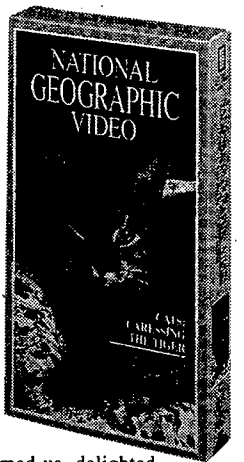

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ing ways to make air bags safer, e.g., by having them open more slowly. But while they're talking, what can people do who decide they'd rather risk not having an air bag than being pummeled by one?

Not much, it seems—and even less in practice than on paper. The NHTSA is considering loosening its restrictions, but for now, it is illegal to remove or disable an air bag without a special waiver issued by the NHTSA. At this writing, according to a Gannett news feature, the agency has received almost 1,400 requests for such waivers and granted most of them. But then what?

I am reminded of the *Peanuts* cartoon in which Charlie Brown agrees to kick yet another football held by Lucy, despite her record of pulling it away at the last instant, because this time she has given him a signed document promising not to. "If you've got a Signed Document," poor Charlie muses, "it must be OK." So he kicks, and (you guessed it), she pulls the ball away yet again.

Signed documents don't do mechanical repairs. People who have spent months making phone calls, writing letters, and otherwise doing battle with bureaucrats may finally find themselves the proud possessor of a Signed Document from the NHTSA, telling all and sundry that this person is allowed to have his or her car's air bags removed. But unless this person happens to be a mechanic, he or she (more likely she, in this case) will then have to show that document to a professional mechanic as authorization to do the job.

And at that point the usual reaction seems to be, "Not a chance!" Most mechanics and dealers, it seems, are

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TECHNOLOGY UPDATE

Why pay for cellular phone service if you only want it for emergency use?

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To be honest, I'm not interested in owning a cellular phone... *except for use in an emergency.* Recently, a good friend told me about the SOS Phone—it's a cellular phone service designed exclusively for emergency use!

What does it do? The SOS Phone connects me to a roadside emergency service, a 911 service or an SOS operator, 24 hours a day. If I ever need help, I know that it's just a phone call away.

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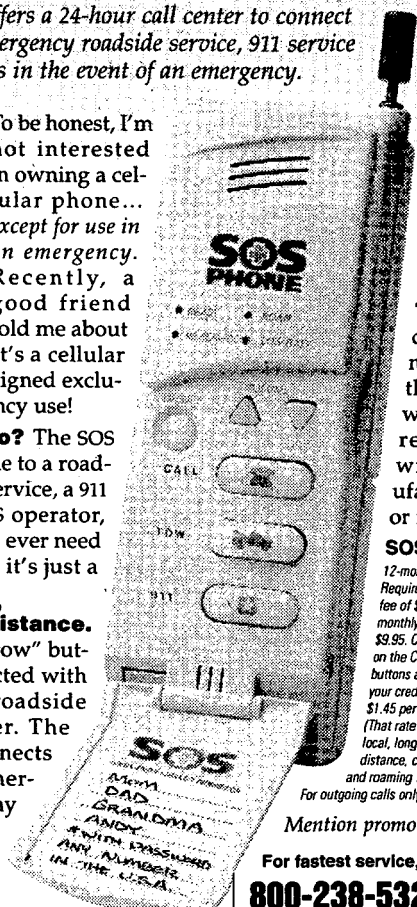

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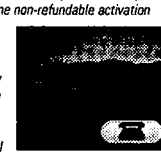

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afraid that if they remove somebody's air bags, and that person is later injured in an accident, the accident victim will then sue the mechanic for having removed the air bag! Never mind that the plaintiff knowingly and deliberately asked and paid to have the air bag removed, and had written permission from the appropriate government agency to do so.

The sad part is that the mechanics' worries are probably well-founded. The big problem isn't that air bags are sometimes dangerous. The big problem is that we have a culture which is simultaneously so afraid of risk, and so addicted to litigation in a court system inclined to grant bizarre awards, that a person injured in an accident very likely *would* sue the mechanic she hired to remove her air bag, and would have an excellent chance of winning.

But why should that be? Since the driver made a conscious decision to have the air bag removed, why should she not simply be required as a condition for doing so to assume responsibility for all consequences of that decision? That NHTSA waiver should have built into it an ironclad condition that the person who requested it *is* responsible, and forfeits all right to hold any other person responsible for any consequences of no longer having an air bag. And that condition should be supported by a legal system that makes it binding, so that any attempt to bring such a suit would be laughed out of court before it wasted any of the taxpayers' money.

What we need even more urgently than a way to improve the already pretty good safety record of air bags is a drastic overhaul of the philosophy and practice of our legal system. We need a far wider recognition that people are responsible for the consequences of their own decisions and actions. Decisions and actions often involve creating risks, and we need a mechanism for allowing people to take risks *without* the safety cushion of knowing that if they get into trouble, they can pass the blame to somebody else and win a nice cozy lawsuit. And that need extends far beyond the specific question of air bags.

Air bags are just one example of a situation in which different courses of action involve different sets of risks. At present the Officially Protected set is that of risking being decapitated by an air bag, on the theory that that is preferable to the risk of being tossed through the windshield because you don't have an air bag. It is written that that is the Safest Way, so mechanics are (relatively) safe from lawsuit if they don't touch the air bag. But if a car owner would rather choose a different set of risks, why shouldn't they be able to do so, provided they forfeit the "right" to hold anybody else responsible for the consequences—*and make that forfeiture binding?* Such a restructuring of the law would actually benefit drivers who want to remove their air bags by making it far easier to find a mechanic willing to do the job.

And such a general shift in attitude would benefit others, too. Rock climbers have sometimes found themselves banned from places where they would really like to climb, simply because the owner, whether private or public, didn't want to risk being sued

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if a climber was injured. Why can't the owner simply post prominent signs, or require an agreement on an application for a permit, warning that ALL CLIMBING IS DONE AT THE CLIMBER'S OWN RISK—and make it stick? They can post signs like that now, but they're pretty much meaningless since judges and juries are so willing to make excuses for exceptions.

We have somehow developed a culture in which hardly anybody is required to take full responsibility for their own actions. They can usually dupe some court into blaming somebody else for any unfavorable outcome, so anybody who can imagine any way they might be sued for somebody else's self-inflicted mishaps will try to make sure they can't happen. Thus we get things like bans on climbing or swimming, mechanics unwilling to remove air bags even for customers who would really be better off without them, and lately even employers trying to dictate the after-hours conduct of their employees. The temptation to tell employees they can *never* smoke, for example, is very seductive if you're a nonsmoker and you're told that this will keep your insurance premiums down. But what if the next thing they want to go after is one of *your* pet vices? Just how much meddling are you willing to tolerate in your personal life for somebody else's indirect economic benefit?

It's true that actions have indirect as well as direct consequences, and sometimes those need to be considered—but trying to anticipate *all* of them can quickly lead to ridiculous and oppressive excesses. We are often told, for instance, that we must protect people from damaging themselves through actions like smoking cigarettes or refusing to wear safety helmets because the state must bear the cost of treating and supporting them. But why must it? Why can't the state simply make it clear at the outset that it will *not* take care of people who've done stupid things to themselves—and then refuse to do it? Sure, it sounds harsh—but maybe we need to let more harsh consequences happen. What motivation do individuals have to avoid stupid actions if they don't really *have* harsh consequences?

John W. Campbell, my predecessor once removed, used to like to say, "Behold the tortoise: he maketh no progress unless he sticketh out his neck." Yes, some risks are stupid—but others are an essential part of learning to do anything new. People vary widely in their personal willingness to take risks, and that's normal and inevitable. What's scary about our present culture, of which various aspects of the air bag problem are symptomatic, is that we currently seem to have an epidemic of unwillingness to accept either risk or the responsibility that comes with it. But what's even scarier is that we have become culturally intolerant of letting *other* people assume risks and responsibilities for themselves.

And *that* is *dangerous*. ■

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Part Two of Three

Frederik Pohl

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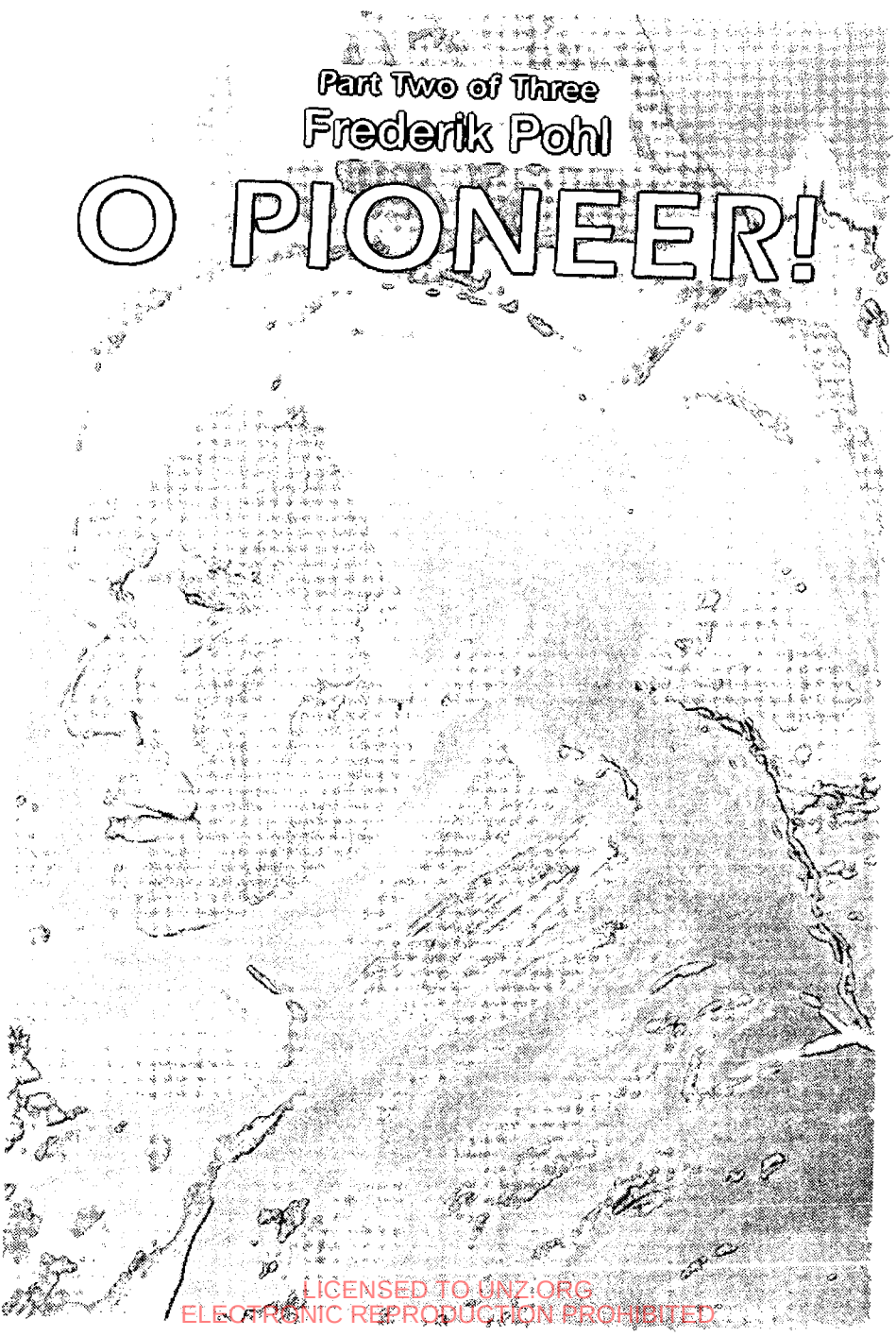

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Tupelo was like a cultural jigsaw puzzle, with pieces from several boxes all dumped into one.

Illustration by Bob Eggleton

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SYNOPSIS

For Evesham Giyt life in the low-rent district of Wichita, Kansas, was easy. Because he was good, maybe the best in the world—at teasing into any computer datafiles whatever data he wanted them to hold—he had plenty of money, no responsibilities, and plenty of time to indulge his personal interests, of which he basically had two. One was daydreaming about famous conquistadors of the past, whose lives were so much more exciting than his own. The other was his lover, Rina. The fact that Rina had once been a prostitute didn't bother him; she had retired from that line of work long since and was currently taking business-management courses at the local campus of the University of Kansas. The only thing that really bothered Giyt was that Earth was fully explored. It had no new lands left for a person like Giyt to conquer—even if he had been willing to actually do any conquering, which he wasn't. Conquering generally involved a lot of killing. The last thing Evesham Giyt ever wanted was to kill anybody.

What changed Giyt's life was that he met a recruiter for the planet Tupelo.

Tupelo was by all means the nicest planet Earth's astronomers or interstellar probes had ever discovered. It had Earth-like air, climate, and gravity. Maybe it was a little short on land area—the planet was basically all ocean, apart from one fairly puny continental land mass at its pole and a scattering of islands—but, taken all in all, it was eminently suitable for colonization.

It did have one minor drawback. Five separate species of extraterrestrial aliens were colonizing it already.

However, that wasn't a big problem. The aliens were willing enough to let Earth humans immigrate as well. What was more, the Extra-Earth Foundation—Ex-Earth for short—was prepared to subsidize any would-be colonists. Getting to the planet was no problem, either. You stepped in one door and stepped out another, thanks to the amazing Sommermen FTL transport system.

It seemed to be just what Giyt wanted. He signed up at once and, with Rina by his side, took the plunge.

The planet Tupelo turned out to be just about as attractive as the recruiter had promised. Rina quickly made friends with their next-door neighbors, the same-sex couple of Mrs. and Mrs. de Mir and their brood of children, while Giyt's computer skills fit right in with the needs of the little Earth colony. When he had reworked the budget systems so they could function efficiently, Ex-Earth's local representative, Hoak Hagbarth, took Giyt aside and made a suggestion. The current Earth mayor was retiring. They needed a new one. Why not the man who knew how to run the system? And when an election was held, to Giyt's astonishment he won by a landslide.

He discovered that one reason no one had specially wanted to compete for the job was that its duties were mostly ceremonial, but it did have

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one obligation. The Earth mayor, along with his opposite numbers from the five alien species, was required to take a seat on the planet's Joint Governance Commission.

The aliens were a bit of a shock to Giyt and his wife. They came from five planets of four different stars, and not one of them looked at all human. There were the Delts, so-called partly because their planet's star was Delta Pavonis, partly because of their triangular heads with their independently wandering eyes; the Delts were the race charged with providing the community with electrical power from their fusion plant on a nearby island, and their company wasn't particularly pleasant because they smelled bad. There were the Petty-Primes, tiny hairless bipeds about the shape and size of marmosets; they were the easiest of the aliens to get along with, and Rina was enchanted with their friendly, kitten-sized young. The Kalkaboos were more or less primate in architecture but with glittery, solar-paneled skins, and the only thing Giyt and Rina found to object to in them at first was their every-morning religious ritual of setting off huge firecrackers at sunrise to blow away the previous day's sins. Finally, there were the two races from planets of the star Alpha Centauri. The Slugs looked more or less like large, furry-skinned amoebae, extruding eyes and members as necessary; they liked a damp climate, so they occupied a village of their own down in some sludgy, river-bottom land, outside of the community where all the other races lived. The Centaurians looked, more than anything else, like curly-haired anteaters. What struck Giyt and Rina as most curious about them was that, although the female Centaurians were roughly the size of sheep, their males were not much bigger than mice and spent most of their time clambering around the fur of their mates.

It was those two, the Slugs and the Centaurians, who had first settled the planet Tupelo, after fighting a devastating interplanetary war against each other a little earlier. When they met on the new planet they had learned their lesson. They signed a treaty of perpetual peace on what they called the "Peace Planet," and as new races arrived they were required to sign it as well.

The meetings of the Joint Governance Commission were simplified in one way by means of little earplug translators, so that at least the various races didn't have to learn each other's forbidding languages. What made them complicated was that, in spite of the name of the planet, the meetings were seldom all that peaceful. The Delt High Champion (as the Delts called their leader) was the first to make trouble for Giyt, but most of the members were equally determined to insist on the rights of their species over all others. Only the Centaurian mayor-equivalent, Mrs. Brownbenttalon—her actual Centaurian title was "Divinely Elected Savior"—seemed truly pacific.

There were one or two other an-

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noyances connected with the mayoralty. For one, Giyt felt obliged to set an example by taking part in community activities, like joining the volunteer fire department. Worse was the fact that, although he had very little real power—most decisions were made by Hagbarth, on behalf of Ex-Earth—a good many citizens didn't seem to understand that, and so he was constantly besieged with complaints and requests for favors.

A minor inconvenience was Tupelo's unexpected thirty-four-hour day, but even that had its compensations; Earth humans adapted to it by adding a four-hour siesta to their diurnal schedule, and Giyt and Rina found good uses for that. Rina, now a respectable matron, ventured to make contact with her estranged sister on Earth, who welcomed her back into the family. And Tupelo, after all, was full of interesting things for Giyt to do. Along with Amelia Patroosh, an expert from Earth, he visited the Delt powerplant on Energy Island and planned to take the suborbital rocket to the planet's factory complex on the polar continent.

But there were some puzzles.

For one there was a nagging question: if the FTL portal-to-portal transport system was really the invention of the Earth scientist, Sommermen, how did it happen that all the aliens had been using the same system long before an Earth human ever got there? And—although the humans on Tupelo referred to themselves as the "Earth colony"—wasn't it a bit strange that every one of them came from one single nation, the U.S.A.?

Part II

X

The celebrated inventor of the faster-than-light transmission portal, Dr. Fitzhugh Sommermen, remains in a coma after suffering a major stroke. The attack occurred while the scientist was being interviewed on European network television. His physicians have declined to offer any prognosis for his recovery, saying only that he is resting comfortably and that all possible measures are being taken. In a related story, US President Walter P. Garsh interrupted a news conference this morning to deliver a typically outspoken attack on the European reporters who were questioning Dr. Sommermen at the time. "When will they stop badgering this poor man?" the President demanded. "No one can pretend that it is only scientific curiosity that continues to impel them. They want secrets, and they want them for their own use. Well, they won't get them. These secrets belong to America, and we aren't giving them away."
—Earth news transmission to Tupelo

Once his wife had called it to his attention, Giyt began to ponder the question. It seemed to be true. There weren't any Tupelovian humans from anywhere on Earth but the U.S.A., and why was that?

The person to ask, of course, was Hoak Hagbarth. The Ex-Earth man shrugged it off. "America's where our funding comes from, right? So I guess that's where they do the recruiting, too. Probably they'll get around to the rest of the world sooner or later. Make

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sense?" And when Giyt nodded, Hagbarth pressed on. "Listen, Giyt, I need to talk to you about something else. I wanted you to take that trip to the island for a reason. You saw those monsters in Ocean, right?"

"Yes?"

Hagbarth gave a rueful sigh. "Mean-looking bastards, weren't they? I have to admit, every time I take the chopper over there they scare the crap out of me. Can you imagine what would happen if the chopper broke down over Ocean and had to come down in the water?"

"I think it has flotation devices," Giyt said.

"Sure it has, if they work. But can you imagine what it would be like to be waiting for rescue out there? With the damn shark things doing their best to climb aboard for dinner? They're *big*, Giyt. They'd probably swamp the thing, trying to get at the passengers—and lots of women and children take that flight, Giyt. And there'd be the damn monsters, tipping the chopper over and everybody screaming and—"

"Yes, yes. I get the picture."

"So what we need," Hagbarth said, getting to the point, "is some kind of protection. A couple of guns for the pilot to carry. To shoot the animals so they can stay alive out there waiting for help."

He paused, inviting a response from Giyt. "I guess that makes sense," Giyt said cautiously.

"Only the trouble is, the eeties have this damn rule against importing weapons. So what I think you should do, at the next meeting of Joint Governance, you could make a motion to let us import one or two guns for the pilots to carry. For defense against the sharks. Do you think you could do that?"

Giyt considered the question for a moment. It didn't sound entirely unreasonable. It didn't sound entirely kosher, either. He said cautiously, "I guess I could try."

"Good, Evesham! I knew we could count on you. And, listen, try to be not too specific about the number of weapons, all right?"

If there was one thing Evesham Giyt had learned in his time on Tupelo, it was that he had a lot to learn. So whenever he found a moment—which is to say when he wasn't asleep, or doing his household chores, or fending off the demands of his constituents—whenever there was a crumb of unbudgeted time at Giyt's disposal he used it to work on Tupelo's immense data base.

His best time for that sort of homework was first thing in the morning, when an Earth-conditioned human being would have slept his full eight hours and still had the remainder of the long Tupelo dark before the sun rose and the work day began. Those were the hours Giyt spent filling the voids in his knowledge—some of the voids, anyway. Prohibition against importing weapons? Oh, yes, there was one. As far as Giyt could tell there had never been any exceptions allowed. He supposed it could do no harm to ask. Electric power? Yes, the Delt pilot had spoken the truth: When the Delts discovered the planet they

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earned their way into the communality by building the fusion plant. Utilities in general? There were surprises there for Giyt, who had not given much thought to how the various races divided up the chores of building and maintaining the community's infrastructure. It turned out that Petty-Primes handled waste disposal, at least until everything solid had been mulched and diluted and the resulting sludge poured into the sewage lines, which were Slug. Power was Delt, of course. Building and maintaining the little cars everyone used to get around was a Centaurian task. Kalkaboos controlled the weather satellites and the polar rocket.

And the Earth humans?

Giyt was somewhat taken aback to discover that the only communal task reserved for Earth humans was clearing land and preparing it for agriculture. Every species had its own farm plots, of course. Humans had cattle and goats, some of the other races maintained fish farms, while the Delts and the Kalkaboos alone occasionally fished in Ocean. The Kalkaboos also practiced a sort of vermiculture, maintaining flocks of wormlike creatures that lived and grew underground and returned to the surface only to spawn—and to be captured for food. But the drudgery of digging out places for the fish farms or chopping down the trees to make new farmland—that was for human beings. Dr. Patroosh hadn't been out of line when she complained. It was true. The other races treated Earth as a kind of Third World planet.

The whole question of infrastructure was unfamiliar to Giyt. Just as you got electricity by turning on the switch, the way you got food, for example, was to take an autocab to the nearest restaurant. It didn't matter whether the food originated in a garden plot next door or on some agrotech industrial farm ten thousand kilometers away. All you needed to get the food was money, and the way you got money was by holding a job. Or by living on the government grants, like most of the people in Bal Harbor. Or, in Giyt's own case, by milking it out of some corporation's files.

Thinking of money made him think of that spendthrift way the Delts treated gold. That, the datafiles informed him, was a consequence of their home planet's geology. The Delta Pavonis planet was unusually well endowed with heavy metals in general. There was plenty of uranium, for instance, rich in its fissile isotopes—so no wonder they were good at nuclear power—and an inordinate amount of precious metals, including gold. The Delts didn't prize the gold for its beauty, it seemed, but because it was so easily worked, and so unlikely to corrode. And, of course, so plentiful.

Giyt grinned to himself. Cortez, he thought, would have had a hell of a fine time on the Delt planet. He probably wouldn't even have had to hold the Delt general manager in a cell, as Cortez had Montezuma, to force him to cough up his treasures. He probably just could have picked up all the precious metal he could carry as chunks of street litter.

Which led Giyt to wonder what the Delt planet was like, exactly, and that

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was when he got the greatest surprise of all.

No human being had ever been allowed to visit the Delt planet.

Nor had any human ever set foot on the home planet of any of the other races on Tupelo; and none of those other races had ever visited Earth, either. The races never had any face-to-face contact at all except what occurred right here on Tupelo when, every 113 Tupelo days, representatives of each of the six planets came together here to talk.

And the next scheduled meeting of that sort was only a few weeks ahead.

The Kalkaboo dawn racket made him realize that it was getting light outside. He winced as a particularly loud firecracker went off somewhere nearby—some Kalkaboo was expiating some particularly nasty sin by blowing it to bits—and went looking for Rina to tell her his discovery.

He found her in the kitchen, carefully feeding some sort of mashed vegetable to the baby from next door. Matya was at work, she explained, and Lupe had taken the older ones to the lake for an early-morning swim. The conference of the six races? Oh, sure, she told him, that was what Matya was doing this morning, overseeing construction of new and better quarters for the dignitaries from Earth. She thought Giyt must have known about that. Everybody did. And listen, as long as he was here, what would he think if they invited Lupe and Matya over for dinner some evening soon?

He paused, in the middle of lifting the lid of something that was simmering on the stove. Here was another surprise; they had never had dinner guests before. "With the five kids?"

"Maybe after the kids are asleep; they get one of the Donar girls to babysit for them sometimes. Or we could bed the kids down here, for that matter." She picked up the baby and held it to her shoulder, gently massaging its back as she studied Giyt's face. "I'm just thinking we ought to get to know more people socially. Of course, if you don't want to—"

"No, that would be fine," he said hastily. "Maybe we should invite the Hagbarths, too."

The baby emitted a moist burp; satisfied, Rina replaced it in its chair and resumed the feeding. After a moment she said, "Maybe. . . . Well, to tell you the truth, I'm not that crazy about the Hagbarths."

"Oh?"

"We can have them if you want them, but—well, I've known guys like Hoak Hagbarth. When I was hooking, you know? There was this one guy, good-looking, nice body, good manners; it made you wonder why he wanted to pay for it. We didn't just jump in the sack. He made it like a date, brought a bottle of wine and everything, and when we got to bed he was sweet and so, well, loverly that I almost didn't want to charge him. And then before he left he beat the shit out of me."

"Oh," he said again, though this time his tone was quite different—having nothing more useful to say. He got up and walked aimlessly to the door, pausing to kiss the top of Rina's

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head on the way. Among the other things he didn't know, he reflected, was much about Rina's life before she turned up in Bal Harbor. She certainly had concealed little from him, but he had not encouraged her to talk about it beyond the simple synopsis: poor family, no future, prostitution the easiest way to make a living.

He stood on his little porch, gazing unseeingly out at the street. Down the road a pair of Slugs were running a digging machine, checking some problem with the drains. One of them turned an eyestalk on Giyt, who waved a greeting, admiring their dexterity with the tiny limbs that were usually concealed inside their slimy integument. He wasn't really paying attention. Something had changed about his relationship with Rina. Was it just the fact that now they were "married"? He hadn't thought very much about that before he popped the question, and maybe—

He turned, startled. From the kitchen Rina was screaming his name. "It's the baby, Shammy! He's choking! Come help me, please!"

It wasn't really a big problem. From high-school days Giyt remembered the old Heimlich maneuver, remembered to be gentle with the baby's tiny body. On the first try he got the child to cough a plug of something wet and nasty halfway across the room, and then he was fine. But Rina wasn't satisfied, was overcome with guilt, in fact; begged Giyt to help her rush the baby to the hospital for a checkup. Then she got on the communicator and told Lupe what had happened, wringing her hands until Lupe arrived and the doctor had reassured them both. "Ah, no, Rina," Lupe said consolingly, "it's not your fault. I made the damn goo; I must've left some lumps in it. But you did just the right thing, Evesham, and Matya and I owe you."

And on the way out of the hospital Rina paused in front of the nursery—two tiny infants in the twenty newborns' beds—deep in thought.

"The baby's fine," Giyt informed her, holding her hand.

"Yes, I know," she said, and then looked up at him. "Shammy? I might as well tell you now. I hope you won't get sore. I'm pregnant."

That stopped him in his tracks, "You're *pregnant?*"

She looked embarrassed. "What can I tell you? I guess I forgot to renew the patch." Then she corrected herself bravely. "No, Shammy, that's a lie. I didn't forget. I threw the damn things away a month ago."

XI

The first sentients to visit the planet which Earth humans call Tupelo came from a moon of the sixth planet of the star Alpha Centauri. It appears to be inevitable in the development of any technological civilization that, sooner or later, it will explore space for other habitable worlds. The Centaurians, however, had a stronger motive for such projects than most. For more than five centuries they had been intermittently at war with the inhabitants of their sun's fourth planet. The casualties had been great, the costs enormous. In desperation the Centauri-

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ans sent probes out to every nearby star in search of a habitable world that they could make their new home. Most stars had no suitable planet. The first four planets that might have been livable were ruled out because races of sentient beings already lived there; the Centaurians did not want to flee one war to risk fighting another. When they discovered Tupelo it was everything they had dreamed of: thoroughly habitable, totally uninhabited. But their colony had just begun to feel at home when another race appeared, with the same designs.

—Britannica on-line, "Tupelo"

For Evesham Giyt the news of Rina's pregnancy took considerable thinking over. He had dreamed many dreams in his life, but not one of those dreams, ever, had been about fatherhood.

Giyt didn't find the prospect overwhelming, quite, but it was certainly well and truly *whelming*. It contained so many consequences and ramifications: The raising of a kid. The changing of its diapers. Teaching it the facts of life. Teaching it how to throw a ball. Carving the bird at the head of the table at Sunday dinners, with the wife at the other end and the kid in between (or might it not be the *kids*, plural? because once you started on that track, didn't it get harder and harder to stop?) Baby-sitters; school; helping with homework; nursing through the usual childhood diseases. The list was endless, because this baby business wasn't just one of those things you could grit your teeth and get through. It entailed a total reconsideration of your whole life, and it was *permanent*—or, at least, it was likely to last as long as Giyt himself did. What it came to was a whole and totally demanding new career, and Giyt was a long way from sure how he felt about it. Sometimes he glowered dismally at the wall as he thought of all that time taken up. Sometimes he felt a curious and wholly unexpected thrill of excitement.

He wasn't even really sure how Rina felt about it. Oh, she was conspicuously *happy* about being pregnant, sure. She smiled a lot, kissed him a lot, went out of her way to find excuses to mind the neighbor kids for Matya and Lupe a lot. But how did pregnancy *feel?* He kept stealing glances at Rina when she was looking the other way to see if she showed any signs of—of what? Of morning sickness? Of strange food cravings? Actually, of being different in any detectable way at all. He couldn't find any such signs. Except for this boundless affectionate cheer—not all that different from her usual state—she was just the same as ever. She kept right on with her studies, and her volunteer work at the human hospital, and her attempts to coax the bizarre plants in their front yard to produce flowers. She hadn't changed a thing.

That fact puzzled Giyt quite a lot. He was sure that if he had some organism growing inside of him he would spend a lot of time staring into space and trying to feel the damn thing grow.

But Rina didn't seem to be doing that. As far as he could tell she simply

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went on with her life just as before, as though this business of pregnancy were something, well, *normal.*

When it came time for the next Joint Governance Commission meeting Giyt greeted it with pleasure. It was tangible work to do, and thus a relaxing change from worrying over the perils of approaching parenthood. Besides he had some actual business to propose.

As he took his seat the Petty-Prime Responsible One was already in the chair—well, in his tree—and fussily chirping for order. The Responsible One ran a tight meeting. All in favor of the municipal reports accepted as read, yes; all old business continued for next meeting, yes; then, if there is no new business—

That was when Giyt hastily put his hand up. "I have some new business, honored chairperson," he said, and launched into his sales talk.

It didn't go well. The other mayors listened tepidly, or more likely hardly listened at all, to his graphic description of the predators of Ocean. But when he reached the point of formally requesting permission to import a few weapons for the protection of downed chopper crews he had the Commission's instant attention. There was a mumbling from all five of the other seats, too low-pitched for the translator to make sense of, but the Slug had two limbs in the air before he finished speaking. "Is against all rules!" the Slug declared, slobbering at maximum volume. "No one imports weaponry to Peace Planet ever anyhow, for sure!"

Hagbarth's briefing had prepared Giyt for that. "It is not a case of *weapons,* Principal Slug. It is merely for protection in case of accident. It is precisely analogous to the harpoons the Delts carry."

And of course that got the Delt into it. "Not to be compared! Harpoons vital accessory for skimmers, for purpose providing protein to feed hungry persons."

Giyt had an answer ready for that, too; surprisingly, someone else made it for him. It was the Petty-Prime chairperson who spoke up: "You have of skimmers, General Manager; only three in total. You have of self-launching harpoons, more than one hundred eighty."

"Needed! For spares in case of losses or damages, which are frequent! And, repeating remark already spoken here, are also used for fishing purposes, not merely protection, same as Kalkaboos."

The Kalkaboo High Champion jumped in: "Kalkaboo practice is primarily using of nets for fishing purposes."

"Oh, yes," the Delt sneered. "Poison nets! Also harpoons as well."

"Very small harpoons, very few in number," the Kalkaboo protested; and then it got worse. Several of them were talking at once, the translation phone in Giyt's ear totally unable to cope. Not only Giyt's phone, either. Nobody's translator was making any sense of the chorus of gurgling, baying, moaning, chirping and screeching, until the Petty-Prime rattled his doll-sized drumstick on his doll-sized drum. And kept it up until all the others had quieted

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down and the Petty-Prime declared the subject deferred for future study and the meeting adjourned.

The funny thing was that, through it all, Mrs. Brownbenttalon hadn't said a word. She simply crouched there, eyes half closed, looking almost as though she were asleep; but from his position on her shoulder her tiny husband was raised up and staring. He never took his eyes off Giyt. And, when Giyt said good-bye to them as everyone was leaving, neither he nor his giant wife replied.

When Giyt got home a message from Hoak Hagbarth was waiting for him on the net. "You made a start, at least," Hagbarth told him consolingly. "Who thought they'd go along right away? It's a big decision for them. They need time to get over their outmoded prejudices and face up to the real needs of the present day. So we'll bring it up again next time. Then we'll just keep on bringing it up until they say yes. And, listen, Giyt, you haven't forgotten about the safety codes for the portal, have you?"

When Giyt hung up he stared glumly at his screen for a moment, considering what to make of the rest of his day. What he needed to do was to try to catch up on his homework. He had a lot on his plate, and figuring out how Hoak Hagbarth could circumvent the portal's safety circuits was low on the stack. He had to read all the reports nobody had read at the Joint Governance meeting. Or he could tackle some of the accumulated petitions that kept silting up in his file. That particular part of the job was even tougher than it looked, because a lot of those requests dealt with questions Giyt still didn't really know much about, and so he had to educate himself first. For instance, the guy who had been turned down on moving to the polar mines was now demanding to know why at least the mines couldn't be located just as well on one of the neighbor islands, so he wouldn't have to travel so far. Was that a sensible idea? Giyt had no way of telling. Probably he should begin to look it up . . . and at the same time repair the other gaps in his education, too. The history of Tupelo. The reason it had so many islands and so few continents. Et one damn cetera after another.

But first, and most of all, there was one special subject he could not put off learning more about. So what he began accessing on his screen wasn't any of the problems of Tupelo and its people, it was medical files, the ones that dealt with the dangers and problems associated with pregnancy. Of which, it turned out, there were a lot more than he was really prepared to face. When he got to the part about teratogenesis and how every once in a while a seemingly normal fetus would fail to develop a head, or turn out to have a Siamese twin, he shuddered, closed the file, and went looking for Rina to reassure himself.

She was cooking him lunch, and Lupe was in the kitchen with her. When Giyt came in Lupe beamed up at him. "Congratulations, Evesham," she said, as she got up to kiss him chastely on the cheek. "The little monsters're a hell of a lot of bother, but, you'll see, they're worth it."

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"Thanks," he said, giving Rina an accusing look. It hadn't occurred to him that she would tell some outsider about their new problem—their *situation,* he corrected himself.

But neither Lupe nor Rina seemed to think there was anything odd about it, and Lupe had something on her mind. "Listen," she said, "the reason I came over was to tell you what's going to be happening at the firehouse. You know when there's a fire you'll get a call on your carryphone; then you drop everything and go."

"Go to do what? Wasn't I supposed to be having some training first?"

"Well, that's the thing I wanted to tell you. The chief just decided we're going to have a wetdown today. It's like a practice run, you know? So you'll just get your first lessons on the job. So when we get the signal don't get too shaken up. It won't be a real fire, this time, but we have to show up anyway."

"I thought Matya didn't want you doing that."

"I got an extension, just until the Taste of Tupelo's over; they'll need everybody for that. . . . Ah, there's the call now. Let's go."

And Rina, composedly ladling something into a container, said: "Stew's ready, so take some with you. You can eat it on the way."

When Lupe and Giyt got to the firehouse all five of the gleaming fire trucks were pulled out onto the apron of the garage, motors going, firemen and -women from all over the town clambering aboard. "Here," said one of them, handing something to Giyt. "Put this on."

It was a genuine fireman's hat, like the one he'd owned when he was five years old. Although the shape was the same, this one was bigger and heavier. Also there was an inset square of fabric on the front for Giyt to pin his chrome badge, as soon as they finished making him one. As he clung to the outside of Pumper 3, careening through the streets of the town, the driver—it was that Colly Depslider man from the Energy Island—stole a look over his shoulder and frowned at Giyt. He shouted something Giyt couldn't make out, but Lupe, clinging to the other side of the truck, apparently did. She pulled a slicker from a locker in the side of the truck and passed it to Giut. "Don't try to put it on now," she bawled, "but you'll need it later—why do you think it's called a wetdown?"

Giyt found himself grinning. This was something like! For the first time, he understood why people volunteered for the fire company. Pedestrians were waving to them as they passed, sirens wheeping, all the other traffic scattering out of their way. It wasn't just humans doing the waving. A flock of Petty-Prime young ones, kits no bigger than mice, chased after the procession on their little roller-skate-sized carts, cheeping and cavorting in excitement, until they reached the electronic limits of their freedom and had to turn back. Even a Slug raised itself out of its moist cart to wave a pseudopod. Then they were out of the town, climbing a trail between a human cornfield and rows of Delt fruit-bearing shrubs. They

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were heading up the flank of the central mountains, where Giyt had never been before. Off to one side of the road was a pretty little waterfall, to the other a deep gorge. And then the trucks crossed an irrigation ditch, pulled up in a semicircle and stopped.

They were at the edge of a small coffee finca, with nothing but uncleared native vegetation beyond. These weren't the big trees Giyt had seen below the Slug dam; they were a mass of tangled shrubs, few of them more than waist high, a dozen different species. "Go!" Chief Tschopp shouted. Everyone piled out, uncoiling hoses, hooking pumpers to the giant tanker trucks, revving up the engines. A minute later Giyt found himself part of a three-man team holding the bucking nozzle of a hose that was tearing holes through the patch of native Tupelo crabbushes uphill. He was getting drenched, because he'd left the slicker on the truck, but he was impressed with the force of the stream; the sturdy bushes were simply smashed out of the way. Then, a moment later, the fixed water cannon on each truck began to fire, throwing high-velocity streams to the far edge of the patch, and even the few trees on the site were simply exploding as the water struck.

It took the fire company hardly a minute to get fully deployed, and then it was over. Chief Tschopp bawled, "That's it! Everybody secure!"

But it wasn't really the end of the exercise, because then everybody began laying out hoses to drain, winding them back onto their reels at one end as the trapped water flowed out of the other, and they were moving faster than ever. It was only when everything was back in its place that the chief, standing precariously atop one of the tankers, announced: "Fair. Fourteen minutes 22 seconds to arrival on scene, 58 seconds to deployment, 8 minutes 11 seconds to retrieval. We've done better. Officers? Any comments?"

Lieutenant Silva Cristl raised her hand. "I have one. Giyt, you have to control your hose better. You got me pretty damn wet."

She was, at that. As a lieutenant of fire police Cristl was exempt from the more physical work of a wetdown, but she was soaked anyway. "Sorry," Giyt offered, resolutely not grinning at her.

The chief gave him a suspicious look. "So watch it next time," he ordered. "And get your damn slicker on. Now let's parade."

So Giyt, soaked and uncomfortable under the hastily donned slicker, learned that they weren't quite through for the day, after all. He clung to the pumper's rail as they retraced their path toward the town, now more sedately.

Back in the town they didn't head for the firehouse; they made a ceremonial tour, stopping to wheep their sirens in brief greeting before the firehouses of each of the other species. Giyt was interested to see that each of the other races evidently expected them. All the doors were open. All the fire-fighting equipment of the other companies was on display—green metal tractors for the Kalkaboos, a fleet of smaller, faster trucks for the Delts, an extension ladder for the

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Centaurians. From his position high on the truck he could see nothing of the equipment of the Petty-Primes, though the doors of their dollhouse-sized firehouse were open. Only the Slugs were missing. Their own firehouse, if they needed one at all in their dank surroundings, was no doubt down in their community. But in each of the others at least three or four members of their own fire companies were standing by, listening to the few words—squeals, gargles, grunts—that came out of the PA system as Chief Tschopp spoke to them through the translator microphone, inviting them all to the upcoming fair.

Then the tankers detached to refill at the lake shore and the pumpers rolled back to their own firehouse; the chief reminded everybody that they would soon be receiving assignments for their duties at the fair, and it was over.

In the cart they shared to take them home, Lupe was all smiles. "So how did you like the wetdown, Evesham?" she asked, confident of the answer.

"Actually," he admitted, "I did. One thing, though. I noticed we seemed to have a lot more equipment than the other guys. Do we really need all that firepower?"

"Oh, hell, Evesham, you just wait and see. When we start getting brushfires in the dry season we'll be pumping the tankers dry every time we go out."

"Oh," he said, thinking. Dry season. He would have to do a little digging about Tupelo's seasons, too. He turned and peered up at the mountain, where a large cloud was hanging over the peak. He commented, "Looks like we're going to get rain today, though."

Lupe looked at him peculiarly. "Not from that, Evesham," she said. "That cloud's just orographic uplift. I guess the trade winds are starting early this time."

So there was another key term for Giyt to try to learn something about. But every time he thought he'd have a few moments to put in on a literature search something stopped him. He had another report to read. Or he had to show up at the gateway to welcome the next arriving batch of colonists. Or Rina disappeared into the sanitary room for longer than usual, and he couldn't think of anything but the chance of miscarriage, hemorrhage, *some* damn pregnancy-related thing . . . until she at last came tranquilly out, smiling fondly at her husband's unnecessary concern.

After dinner that night Rina said, "Hon, let's let the dishes wait. I've got a better idea."

It was a clear invitation; but, when they had finished doing what the invitation had intended, Rina propped herself up on one elbow to look at him quizzically. "Is something wrong?" he asked.

"That's what I was going to ask you, Shammy dear."

"Didn't you—"

"Sure I did, hon, but, I don't know, you seemed a little, well, I guess the word is 'restrained.'"

He made a joke of it. "Maybe it's time to get the whips and chains out."

"I could, if you wanted me to," she

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said, startling him; but smiling to show she didn't mean it. "But I don't think that's the problem here, sport. I think you've got the baby on your mind."

"Well—"

"Sure you do, Shammy. Listen. You really don't have to treat me as though I were made out of spun glass. It'll be six or seven months, anyway, before we have to start being careful."

"I was just thinking," he began apologetically.

"I know what you were thinking, but you'd be surprised how hard it is to get rid of a baby." She gave him a thoughtful look, then added, "I don't know if I ever told you, but I was pregnant once before."

"You had a baby?" He was suddenly wondering if there was some part of Rina left behind on Earth.

"Not quite. What I had was an abortion. I was fourteen. And my father found out about it." She was silent for a moment, then said, "I did kind of like the idea of having a baby of my own, but I didn't see how I could manage it. I didn't like the idea of being a welfare mother, didn't have any skills to earn a living. So I stuck it out for a while after the abortion, and then I ran away. I thought I'd go back to school . . . well, I had an ambition about that, you see. I liked the way the doctors took care of me. They were great. Doctors are gods around a hospital, you know. Plenty of money, lots of respect. I thought it would be pretty grand to be one of them. Only it didn't happen, because I couldn't face ten more years of school."

She leaned over and kissed him. "You know something I've always appreciated about you, Shammy? You never once asked me why I became a whore."

"None of my business," he said gruffly, surprised to find himself touched.

"No," she agreed, "it wasn't, but I guess maybe it is now . . . Daddy." She was grinning at him again. "Anyway," she said, "After I ran away, fifteen years old, how else could I make a living? And the work was easy and the money was good, and here I am." She hesitated. "But, Shammy, there's one thing I would like you to know. I screwed a lot of guys, one time or another. Mostly it was business but sometimes not. But I never loved anyone else before you."

XII

The Centaurian colony had settled itself on Tupelo for only a few years when they had an unpleasant surprise. An exploring party of another species arrived. They were not welcome. In fact, they were the very people the Centaurians had been fighting their interminable war with, the sluglike inhabitants of Alpha Centauri's fourth planet.

Although the fighting in their home system had temporarily subsided, it very nearly began again on Tupelo. It was touch and go for a while, but the sides paused long enough to talk a bit before opening hostilities. They discovered they had much in common. The Slugs in the exploration party were as tired of war as the Centaurians. Cautiously, both sides agreed to try the experi-

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ment of peaceful coexistence. They even agreed to share the same island, though at some remove from each other, a decision made easier by the fact that the Slugs preferred the damper, danker climate of the jungle to the plains that had attracted the Centaurians. The two sides signed a solemn compact, undertaking to together occupy what they called "the Planet of Peace" without fighting, and they created a Joint Governance Commission to mediate any conflicts that might arise.

—Britannica on-line,"Tupelo"

A Taste of Tupelo started a couple of days early for Giyt, when the hypermarket called to say his dress uniform for the fire company had arrived. "Fine," said Giyt, who had pretty much forgotten he'd ever ordered the thing. "I'll come right over to pick it up."

"We'll both come, Shammy," Rina told him when he'd hung up, "because I surely want to see what you're going to look like."

At the store Rina sat, peaceably chatting with another shopper, as Giyt pulled the drapes of the store's changing room behind him. It didn't take him long to get into the fire company's dress whites, with their silver buttons and silver-trimmed dress cap. He had never had any kind of uniform on before. And was startled to see how—appropriate?—it looked on him in the changing room's mirror.

Rina thought so, too. "Ah, Shammy," she whispered, tugging his collar straight when he came out, "you do clean up nice, you know?" But standing unexpectedly behind her was Chief Wili Tschopp.

"Very nice," he said. "Keep it on, Giyt. Listen, I heard you were here, so I came over. We need you to make a commercial for the fair. Why you? What do you mean, why you? Because you're the mayor, of course. Don't worry, it won't take long. The cameras are all set up right outside, and I've got your script right here."

So Evesham Giyt had another first for that day, because he'd never recorded a commercial before, either. It wasn't much trouble. All he had to do was read the script, which promised great food, wonderful rides and such splendid entertainment as Olse Hagbarth playing authentic American jazz on her own piano, and the six-year-olds from Ms. Hilda's dance class doing authentic American square dancing. It took three tries before Wili Tschopp was satisfied, but the real drain on Giyt's time didn't come until Rina discovered the commercial was going to be broadcast on the systems of all six of Tupelo's races, with the appropriate language dubbed in. Then Rina was so tickled by the idea of hearing her husband talk Delt or Slug that Giyt decided to give her a treat.

Trying to convert alien TV protocols to anything he had ever seen before took more time than Giyt had expected. But he had his own original recording to match against the ones the others used, and it was, after all, the kind of thing Evesham Giyt was inordinately good at. He took it for granted that the other races would have been eavesdropping on each

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other's newscasts all along. His guess was right, and after some hard digging he succeeded in unearthing their conversion programs.

The rest was easy. All he had to do was adapt their procedures to the Earth protocols. It was tedious work, but nothing he couldn't handle.

Pleased with himself, he displayed for Rina his own image barking, squealing, moaning in all five of the other languages. She was pleased, too. "Save them, hon," she instructed. When he asked what for she said, "Don't you think our child will want to see them some day?" And then Giyt had something else to ponder over.

The actual day of the Taste of Tupelo dawned to the usual artillery barrage from the expiation of Kalkaboo sins. The day was hot, dry, and, as it turned out, extremely long. Right after first light Giyt reported for duty. He got lucky. To reinforce the recorded messages that invited all the eeties to the fair Chief Tschopp ordered him onto a sound truck. So in the early morning Giyt bumped downhill over that horrible forest road to cruise the Slug settlement under the dam, wheeping the siren and reminding the Slugs over the translator loudspeakers that they, like everybody else on Tupelo, were really welcome to come to the Earther fair.

Apart from moments of terror that the fire engine would turn over as it pitched and jerked down the trail, the job could have been worse. Giyt could have been put to setting up the fair's booths and rides. Besides it was a chance to take a good look at Slugtown. He would have been more comfortable if he hadn't been sweating in his full dress uniform. But it was bearable, and at least he wasn't the one who was faced with trying to drive the damn thing through the least watery sections of mud between the Slug huts.

By the time he was back at the fairground (which was the broad space of Sommermen Square before the portal, which Tschopp had commandeered for the occasion) he was convinced that every possible Slug had been well and truly told.

Giyt had seen fund-raising fairs before—barely. Sometimes he had caught a glimpse of them on TV, for that fraction of a second that it took him to realize that this was not a subject that interested him and to move on, sometimes from the window of an autocab that was passing one by, and certainly didn't stop. That was as far as it went. At least since childhood he had never been disposed to attend one. Definitely he had never, ever, been one of the sweating crew that worked behind the game counters and in the refreshment stands and operating the children's rides.

In spite of all their efforts at drawing in the eetie colonists, most of the crowd was human. (If "crowd" wasn't too strong a term for the fifteen or twenty people wandering among the two dozen booths; but, Matya de Mir pointed out when she relieved him for a ten-minute pee break, it was early yet and a lot of people were still at work.) Just after the opening there had been a considerable, but brief, invasion of Petty-Primes, four or five of

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their Designated Mothers shepherding what Giyt supposed to be every young one in the Petty-Prime colony. (Which was a lot. Petty-Primes had a very long childhood, which meant that by the time they reached sexual maturity they were fully educated and ready to be adult citizens.) But the Petty-Prime kits hadn't stayed long. They weren't allowed to eat anything the Taste of Tupelo offered. Worse, all the rides were too big, and all the games of chance too hard, for Petty-Prime children. The other eetie communities were represented mostly by two or three pairs of Slugs that were cruising silently around in their damp-conditioned carts, never stopping at any of the booths, but not leaving, either.

Giyt's own job was running what they called the "coconut shy." It had hard rubber balls instead of coconuts, with an inviting pyramid of dolls and gadgets at the back of the booth for anyone who could knock one down. That did not often happen. The game was fixed. Each ball had a tiny cupronickel core, and Chief Tschopp had privately showed Giyt the button under the counter that would activate a continuously varying magnetic field between the contestant and the prizes. Not even the inhumanly skilled Delts could win unless Giyt let them. He didn't. As a result he had few customers at his booth, next to the wheel of fortune, across the way from the kitchen where Lupe and Rina, among others, were frying potatoes and chicken parts in a huge caldron of fat. Giyt kept looking across at them with concern. It was hot enough where he was; it had to be a lot worse next to the fryer, especially for two pregnant women.

A female voice interrupted his dark thoughts. It turned out to belong to Mariam Vardersehn, his predecessor as mayor of the human colony. "Morning, Giyt," she said, not sounding particularly friendly. "You want to turn off the magnet so I can try to get that Kewpie doll?"

He looked cautiously around, then did as she asked. All the same she missed with the first three balls, fared even worse with the next three. That was enough. "The twins aren't big enough for dolls yet anyway," she said. "How are you liking being mayor?"

"So far, so good. I guess you don't miss it, though."

She gave him a look, then sighed. "Actually," she said, "it was better than changing diapers in this heat."

Her tone made Giyt give her a closer look. "You almost sound as though you'd like to have the job back."

"What does it matter what I'd like?" she asked moodily. "Only, if you ever make up your mind to quit, be sure to let me know."

So Giyt had something else to think about. As far as he could see, there was no way for Mariam Vardersehn to undo the election that had given him the mayoralty. Unless, of course, he were to resign, but he had no intention of that, if only because he didn't particularly like the woman. For that matter, in some moods he didn't even particularly like the job. But the fact that she seemed to want it back made

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it just that little bit more attractive to him.

Which, Giyt told himself with amusement, was pretty stupid, and when Hoak Hagbarth came by he was smiling at himself.

Hagbarth winked at Giyt, paid for three balls, missed with each of them and grinned back at him. "You look happy. Business that good?" he asked.

Giyt, who had no way of knowing how business was supposed to be, shrugged. "I thought there'd be more people, after all the publicity we did. Did you see me on the other-race news broadcasts?"

Hagbarth looked startled. "How can you see the other-race broadcasts? They use their own systems." Then Giyt had to explain that, out of curiosity—he didn't say for the sake of giving his wife pleasure—he had spent some hard hours figuring out how to convert their standards to the ones the human colonists used. "Hey," Hagbarth said admiringly, "that's great. Show me how you did it sometime, will you?"

"Sure."

"I mean really," Hagbarth persisted. "You know you've got a lot of tricks up your sleeve that you say you're going to show me, but I'm still waiting."

"I'm sorry."

"Sorry don't cut it, Evesham. You know what we've got here, don't you? Just a handful of human beings among—" he looked around and lowered his voice—"among all these freaks. We have to stick together. So any way we can help each other out, we have to do it, right? Or the freaks will win. Do you understand what I'm saying?"

Giyt nodded.

"I knew I could count on you," Hagbarth said, reaching across the counter to pat Giyt's arm. "We're all patriots here, aren't we? We just have to work at it a little harder than we would back home, that's all."

XIII

The provenance of the extra-terrestrial race called "Kalkaboos" is unknown. From other evidence certain facts about it can be deduced. Their native planet's atmosphere appears to have been richer in oxygen than either Earth's or Tupelo's, though the difference is not normally enough to handicap the Kalkaboos in their life on Tupelo. Their planet's sun is almost certainly brighter than Earth's, particularly in the extreme ultra-violet frequencies, but it has never been identified.

The Kalkaboos were the third sentient race to arrive on Tupelo, considerably later than the Centaurians and the Slugs. When the Kalkaboos appeared they presented a problem for the prior colonists. They had only two options: to resist the new arrivals or to permit them to join. Since resistance would almost certainly involve combat—and since both the Centaurians and the Slugs feared that such a conflict might easily escalate to involve themselves—they decided the lesser evil was to let the Kalkaboos remain, subject to their adhering to the terms of the Treaty of Perpetual Peace. After a short transition period the Kalkaboos, too, were granted a

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seat on the planet's Joint Governance Commission.

—Britannica on-line, "Tupelo"

When Tupelo's long, long evening began the crowds at the fair picked up. Most of the human population put in an appearance at least for half an hour or so—had little enough choice about it, really, because nearly all of them were relatives or neighbors of a fireman. A scattering of the other races appeared too. Giyt kept feeding balls to a whole Delt family—papa, mama, four half-grown young—as they doggedly did their best to knock off a cuckoo clock or a stuffed panda. Even with the magnets working against them they came close—came closer still when Giyt belatedly realized who the male was. "You haven't recognize?" the Delt asked aggrievedly. "I am he who have been you pilot voyaging to Energy Island, God's sake; we have good talk about you famous Earth human liar Kepigay. How can you have forget?"

"Sorry," Giyt said. He started to reach out to shake hands with the Delt, then thought better of it; he didn't want any of that fetid Delt aroma coming off on him. Instead he surreptitiously switched off the magnetic field. After that it required only four shots from the female to collect three prizes.

Hastily Giyt turned the field back on. When he looked up one of the Delt's eyes was on his face, the other on the hand just emerging from under the counter.

"Thus I had thought," the Delt said amiably. His mate, burdened with her prizes, whispered something warningly in his ear, but the Delt waved her away. "Do not be lacking in intelligence, I not the sort of crude person to make impolite argument with Earth human friend. You go on where you wish, co-parent. Take self and young to next such deceitful event. I remain a short space of time to ask something of Earth human friend."

Giyt braced himself for the question as the Delt leaned forward on the counter, both eyes on Giyt and the slaughterhouse smell intense. There was no point in denying the game was fixed. The Delt was quite capable of leaping over the counter to find the switch for himself.

But that wasn't what was on the Delt's mind. "This 'President' person you possess on native planet home, who tell all other persons they not privileged to share in possession of certain secret information considered valuable. What this Earth human President person being President of, exactly?"

It wasn't hard to explain what a sovereign country was to the Delt—once the Delt was willing to accept the explanation as fact, anyway; his first reaction was unbelieving laughter. But when Giyt finally convinced him that the statement that Earth possessed nearly two hundred quite independent nations wasn't some sort of ludicrous joke Giyt was trying to play on him the Delt went away, chuckling to himself.

At least Giyt hadn't had to defend the fire company's slippery means of enhancing profits on the coconut shy.

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He took note of the fact that, in order to know what the American President had said, at least some of the eeties had to listen in on the news broadcasts from Earth. He wondered if Hagbarth knew that, and considered mentioning it to him. But business was picking up, and he put the thought away for later consideration.

The eetie leaders had begun to appear. Giyt caught a glimpse of the Divinely Elected Savior of the Centaurians, Mrs. Brownbenttalon, interestedly sampling the fried potatoes from Rina's booth across the way. It looked to Giyt as though her entire family was with her. Her principal husband was visible as he perched over her nose, nibbling a French fry and tenderly sticking bits of it in Mrs. Brownbenttalon's mouth. There was a younger female with her whom Giyt hadn't seen before, plus a retinue of sub-adult offspring and a clutch of helper-husbands to keep them in line.

When she spied Giyt she crossed over with her train to greet him. "Hope you stick it well, Mayor Large Male Giyt," she said cordially. "Now look." She pointed her snout at the young female. "This is my daughter, Miss Whitenose, very pretty, right?" Giyt agreed that Miss Whitenose was pretty—for a half-grown anteater, at least. "You give Miss Whitenose three balls," she requested, and the daughter of the house took them without enthusiasm. Without results, either; Centaurian anatomy was not built for throwing. Though Miss Whitenose elevated the first half of her body as much as anatomy would allow for the purpose, her best toss barely made it to the base of the prize pyramid. Mrs. Brownbenttalon didn't seem perturbed; probably she had discovered at many a previous firemen's fair that there was no hope of winning at the coconut shy. "Miss Whitenose almost old enough to be fucked," her mother said with pride. "Soon we buy her some husbands from Mrs. Ruddyblaze family and have big party, you bet."

"She seems to like French fries," Giyt observed tactfully. "I guess Centaurians can eat human food?"

"You bet." It was quite apparent, actually; even the smallest of her children were determinedly nibbling away at a French fry apiece. "Centaurians, humans, very similar metabolism; we eat anything you do except meat."

"No bubbly drinks, too," Miss Whitenose put in.

"Right. Bubbly drinks make us fart. Hey. I have question for you. Who have idea to bring kill-persons weaponry here, you or ugly Large Male Hagbarth?"

"Well, actually, yes, it was Hagbarth's suggestion in the first place," Giyt admitted.

"I think so. Very bad proposal. Took persons by surprise, so maybe got wrong idea, blamed you, mistake. No matter. You don't do it again, all right? So I have got idea. You come to Miss Whitenose First Fuck party, OK? We show you good Centaurian food—like this," she added, pointing to one of the smallest of her offspring. The tiny thing had finished its French fry and was now thrusting its nose into what looked like a segment of a bamboo stalk, held for it by one of the

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helper-husbands. "Bring female mate with you, she welcome. You will have grand enjoyment, don't worry. Now must take kids on dumb high circular ride."

As soon as she was gone in the direction of the Ferris wheel the Principal Slug arrived. It purchased three balls, extruded a peduncle at its bottom to raise it to counter level, produced a skinny arm from the side of its body to throw the balls, missed by a meter or more three times, and left without a word. It was evidently time for all the mayors to put in their appearances. Even the Responsible One of the Petty-Primes gave the coconut shy a whirl—pretty hopelessly; he just didn't have the size to knock anything down, although in charity Giyt had turned off the magnetic field. The Responsible One moved on to the Ferris wheel in his turn without comment, just as the High Champion of the Kalkaboos arrived with a party of six.

Once they'd been sold three balls apiece they huddled for a long, low-voiced session of cheeping and screeching that Giyt's translator couldn't quite sort out. What it looked like to him was some Earthly gathering of good old boys organizing some sort of friendly competition—well, some sort of competition, anyway; the voices didn't sound all that friendly—but what they were mostly doing was keeping anyone else from getting to his booth. His attention wandered. He gazed around the fairgrounds, getting a glimpse of a pair of Slugs in the whirlabout ride, their gelatinous bodies plastered around the seats of the car, even their eyestalks retracted. The crowd was really becoming a crowd, he thought, and waved to catch his wife's eye as she doled out her portions of food across the way.

He didn't notice that the Kalkaboos had finished their conversation until one of them stepped rapidly up to the counter, fired a ball at the central stack of prizes, and knocked off a tempered-glass piggy bank. "Congratulations," Giyt said jovially, realizing he had forgotten to turn the magnetic field back on. But while he was picking up the piggy bank for the winner the second one was already there, knocking down a Kewpie doll. The third got another doll, the fourth a key chain in a large plastic box, the fifth a pocketknife. They were getting to the expensive stuff now, Giyt realized, and managed to switch the field back on just as the sixth Kalkaboo, their High Champion, fired his first ball.

He missed. It wasn't even close.

His retinue cackled jovial condolences at him. Or maybe not so jovial. The High Champion seemed to take his failure hard, and he turned and doggedly fired his second ball—equally far off the mark—and his third.

Breathing hard, he turned to glare at his companions, who were raucously taunting him on his failure to score. And then, without warning, the High Champion moaned and clutched his head and fell to the ground.

That stopped the chorus of friendly bickering. All five of the other Kalkaboos immediately surrounded their fallen High Champion, muttering inaudibly to each other, and then

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picked him up and carried him away.

XIV

Little is known of the religious observances practiced by most of the extraterrestrials with whom the human race shares the planet Tupelo. The Delts and the Petty-Primes don't seem to have any. Nor do the Centaurians, although their leader, puzzlingly, is referred to as their "Divinely Elected Savior." The Slugs are said to be intensely religious, expressing their fervor in song. Unfortunately, all their hymns are sung in a special "divine" language, which the machine translators are not equipped to handle.

It is the Kalkaboos whose religious rituals are most public, and thus best known. The most conspicuous of their customs is the one which requires them to "explode" and thus destroy each day's burden of sins by setting off small charges at the dawn of the next day. This has struck some observers as grotesque, but not nearly as grotesque as some other customs of the Kalkaboos.

—Britannica on-line, "Tupelo"

The good thing about the High Champion's accident was that it happened so fast most of the fairgoers didn't even know what was going on. Chief Tschopp did, though, and descended on Giyt like a thundercloud. "Damn fool," he said. "You should've been watching what you were doing. Now we're going to have the goddam High Champion sick in bed with a major oxygen-deficiency headache, and I'll be screwed if they don't make some sort of formal complaint before dark. How could you do this to the fire company, Giyt?"

Giyt had no answer, though the accusation was unjust . . . but, well, not entirely unjust, Giyt thought. He should have had the magnets back on before the Kalkaboos got there. And he had trouble getting to sleep, weary as he was, when at last the Taste of Tupelo was over and the firemen were allowed to go home and to bed.

When he woke up his first action was to call the High Champion's mates and ask the one who answered how he was doing. "The beloved person is resting," she said, without further comment, and cut the connection before Giyt had a chance to apologize.

He sat down at his work station and stared into space a while, sipping coffee and brooding over the accident. *It wasn't my fault,* he told himself again. That raised the question of whose fault it was, but he figured that out quickly enough. It was the fault of the fire company for running crooked games at the fair. That wasn't honest. More to the point, the fact that the games were fixed probably wasn't a secret to at least some of the eeties. The Delt, for one, had been clearly aware he was being taken. And how did that look for Earth humans as a race? And all for the sake of making a few dishonest cues.

Did the fire company need money that badly? Just for curiosity's sake, he accessed the stats for the Taste of Tupelo in previous years. When he saw what they were he stared into space a while longer. All bills paid, all receipts

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recorded, the Taste of Tupelo had never made a net profit of as much as six thousand cues—or, Giyt calculated, just about enough to pay for a new set of tires on a few, but not all, of the company's fire engines.

It wasn't worth it. He was still puzzling over it when Rina called him to breakfast. Of course, she picked up on his mood at once. The morning chorus of Kalkaboo firecrackers to announce the dawn—louder than usual, Giyt thought—made conversation difficult. But as soon as it was over, she asked, "Hon, are you worrying about that Kalkaboo?"

He blinked at her. He had almost forgotten the High Champion's mishap. "Oh, sure," he said. "Sort of. But mostly I was thinking about money."

"Money? Really? Is there something real expensive you want to buy?"

"No, that's not it. Not *our* money. The fire company's." But while he was trying to explain his carryphone rang with the fire company signal. It was an all-hands summons. "We'll talk about it later," he said, reluctantly getting ready to go over to the fairground to help break down the concessions.

This time the work was pure manual labor, not made easier by the way the other firemen joshed him about the Kalkaboo High Champion. Even Lupe gave him a couple of friendly jabs, until she saw that he was really unhappy. Then she said, "Well, forget it, Evesham. Kalkaboos are always passing out for some reason or another; the atmosphere's too dense for them here or something. He'll be fine."

It was hot work, but not particularly hard work. It went quickly enough. What eased the labor was Ex-Earth's generosity with handling machines. Once the smaller pieces were crated and the booth walls were flat on the ground three forklifts trundled up. They lifted the material onto a flatbed trailer, which carted them off for storage. Giyt went back to the firehouse with the last load, while others remained to tidy up the space the fair had occupied.

He had never been in the storage warehouse before. From outside it looked like a low-roofed shed behind the firehouse. Inside it was dug deep into the ground, and a lot bigger than he had expected. All that space was needed, too, because it was crammed full of equipment: spare parts for the fire engines, extra hoses, even an entire additional pumper truck. One bin contained six additional water cannon, far bigger and more powerful than the ones mounted on the trucks. He gazed at them for a moment, puzzled, then turned to Lupe. "What are these things?"

She glanced at them and shrugged. "They're just extras. We don't use them. They're too powerful for the kind of work we do—I think back on Earth they demolish burning buildings with them. Hoak probably knows, if you want to ask him."

Giyt did, but not as much as he wanted to ask him about finances. But Hagbarth didn't show up at the firehouse, and when Giyt found a chance to call him the man announced he was really in a hurry. "Finances? Why are you worried about that kind of thing, Giyt? Well, tell you what I'll do,

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why don't I come over to your place after siesta, that OK?"

"That would be fine."

"Fine. And, oh, by the way. The High Champion's still in a coma."

"Coma?" Giyt was startled. "Nobody said anything about a coma!" But Hagbarth had already cut off.

Giyt slept poorly during the siesta. Long before it was time he slipped out of the bed, leaving Rina gently breathing behind, and placed another call to the mates of the High Champion. "In present condition of beloved High Champion is no change," the female Kalkaboo said, and cut off. The translation programs weren't adequate to let Giyt tell anything useful from her tone.

To take his mind off it, he went back to thinking about the community's finances. The wealth of material in the fire company's warehouse had been a total surprise to him, far more than a thousand Taste of Tupelos could ever hope to pay for.

He decided to dig a little deeper. It turned out that most of the data he wanted was in a secure file, though not secure from Evesham Giyt. He accessed the community's whole balance sheet without difficulty.

What he found made him very thoughtful. Tupelo was a gilt-edged proposition, but basically a charity operation. They were living on handouts from Ex-Earth. Very generous ones. Somebody was investing a great deal of money in a venture that was providing next to no cash returns at all.

But *why?* Tupelo was a whole planet, undoubtedly packed with riches. In the days of Earth's conquerors they had gained more than military victories—they had gained sources of gold, spices, rare woods, treasures of many kinds. Why couldn't Tupelo pay its own way in the same fashion? Because charity was all very well, but what if the philanthropists ever got tired of giving?

When Hagbarth arrived, looking mildly resentful at Giyt's imposition on his time, the first question Giyt had for him was: "What happens if Ex-Earth runs out of money?"

Hagbarth gave him a suspicious look, then relaxed. "Don't worry yourself about that. Never happen, Giyt. Ex-Earth is *loaded.*"

"It looks that way, all right. But where does the money come from?"

Hagbarth shrugged. "Public-spirited citizens. People concerned about the future of the human race—hell, Giyt, all that should have been in your briefing materials. You didn't get any?" He rolled his eyes. "What can I tell you? Ex-Earth pays the recruiters so much a head for volunteers, so once they've got you to sign up, what do they care? Anyway, the money's there. We have pledges from some of the richest people in America, and some of the biggest corporations, too. And I'm not talking about just one-time donations. They've all made fifty-year pledges, and they'll keep their words."

Giyt nodded. "And what happens when the fifty years run out? There's what left, thirty-five years or so?"

"Long enough not to worry," Hagbarth said, smiling.

"For you and me, maybe. But I do worry. I've got a child coming."

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Hagbarth said sympathetically, "Yeah, I see what you mean. Olse and I haven't been that lucky, so maybe I haven't really worried about that kind of thing. I guess we figured if Ex-Earth pulled the plug we could just go back to Earth and retire."

"But what if we don't want to do that?" Giyt persisted. "If we have a kid that grows up here, what's he going to do back on Earth? Besides, my wife likes it here."

"That doesn't surprise me," Hagbarth said shortly.

His tone made Giyt look at him in surprise, but Hagbarth's face wasn't giving anything away. "Well, what I've been thinking," he said, "it doesn't have to be that way. Couldn't we pay for ourselves?"

"Pay how?"

"Ship stuff back to Earth. Earn money."

"Well, we do the best we can that way, Giyt. You know that. We send back all that souvenir stuff to Earth that we make here—"

"That's not money, Hoak. The amounts involved are pitiful. We should try to earn real money. The other races do, don't they? I mean, they're always sending local stuff home through the terminal. I presume it earns money for them. We could do the same."

Hagbarth was looking wary but no longer suspicious. "What kind of local stuff?"

"Organic materials, for a start. The Petty-Primes ship whole saplings and bushes back, roots and all; I think it's so they can be checked for possible pharmaceuticals or new food crops, that sort of thing. Why don't we? And the Delts do a lot of manufacturing. We could do much more of that, too. Not just gadgets; real goods. We've got metals and stuff from the polar mines. We could build things—some to ship home for credit, a lot for ourselves right here."

Hagbarth pursed his lips. "You've never been to the polar mines yet, have you? Sure, they've got processing stuff up there, but most of it isn't ours. We just have a little corner of the works. What you call boutique factories, you know? Anything big, they don't do much more than forty or fifty copies in a run."

"So we can build our own, can't we? So there will be something the Tupelo humans can do to earn money instead of living on handouts?"

Hagbarth looked as though he was tiring of the subject. "Well," he said, "maybe you've got something there and maybe you don't, but I guess it could be looked into. Tell you what. When the Earth commissioners come for the six-race meeting I'll see if I can get them to send some specialists along, check over what the possibilities are here. How would that be?"

"Fine," said Giyt, making a mental note to remind Hagbarth of his promise.

"Then that's settled. I'd better be getting along—and listen, you won't forget about those programs for me, will you? Because—oh, wait a minute."

He paused, listening to a message from his carryphone. Then he looked angrily at Giyt. "Shit," he said.

"What's the matter?"

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"It's the goddam Kalkaboo High Champion. He just died."

"Died? But I thought— Oh, hell, that's too bad."

"Yeah, well, they'll be boiling him all night—"

"Boiling?"

"It's what they do, Giyt. So the funeral will be at dawn tomorrow, and you'd better be there. See, basically they figure you killed him."

XV

Well, what do you say, folks and folkesses? Did we have one grand time at the Taste of Tupelo yesterday or did we not? The beer was cold, the rides were fun, and weren't those little kids just adorable? Even the eeties. Sure, if you're the picky kind of person that's always looking for the worm in the mango you can say a few things went kind of wrong. I'm sorry I had to arrest two of our citizens—I'm not going to say their names over the air, but you all know who they are—but, hey, a night in the cooler straightened them right up and they'll be home with their loved ones this morning. And it's too bad what happened to the Kalk High Muckamuck, but if the Kalks can't play a friendly game of chance without throwing some kind of a tizzy fit when they lose, whose fault is that? Anyway, I'm sure we all join in offering our sincere sympathy to his spousal units and all the other Kalkaboos for his funeral services this morning.

But what's the use of looking at the dark side? Put it all together, it was a great Taste, and I want to be the first one to rise and move that we pass a real vote of gratitude to Chief Wili Tschopp and his hard-working, fun-loving men and women of the volunteer fire company, even if, heh-heh, I happen to be one of them myself.

—Silva Cristl's early-morning chat

The funeral of the High Champion, like all major Kalkaboo events, took place at dawn. So an hour before daybreak Giyt had to visit the Kalkaboo general store in order to buy a firecracker for the ceremonies.

Giyt had never been in the Kalkaboo store before. It was crowded. Nearly everyone else present, naturally enough, was a Kalkaboo. None of them spoke to him, and they looked at him, if at all, only out of the corners of their eyes, but he recognized that they were all on the same errand as himself.

What puzzled him was what size firecracker to buy. The Kalkaboos themselves were buying all sizes, from tiny beads to things the size of a baseball. He looked around for a friendly face but found none. He did, however, see the Petty-Prime Responsible One picking up something about as big as a thumbnail, which emboldened him to reach for another of the same size from the bin.

It was the wrong choice. A feathery hand snaked past him to clasp his own, and the voice of the translator in his ear snapped, "No. Not adequate. Come with." And a Kalkaboo Giyt did not recognize led him to the back of the store. There was a muttered exchange with a clerk, who retired to

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the storeroom for a moment and emerged with what looked like a bright blue grapefruit. "Pay now," Giyt was ordered. "This little other thing is detonator for making bomb bang, don't push till it's time. Now go."

The object weighed twenty kilograms at least. By the time he got it to the cart, where Rina was waiting, he was panting.

For the ceremony the Kalkaboos had preempted the square in front of the transporter, the same space that had held the Taste of Tupelo just a day earlier. As Giyt and Rina got out of their cart they found they could smell the late High Champion even before they saw the pot he had cooked in. Actually he smelled rather appetizing, a bit like a lamb stew. Rina had hurried next door for advice and so had been able to explain to her husband that, yes, Hagbarth hadn't lied. Kalkaboos simmered their dead overnight. Lupe didn't think you could call it a religious thing, exactly, but it was certainly a pretty much inviolable custom, like the human habit of embalming. What they did with the corpse afterward was unclear, because Rina hadn't had time to get more details from the de Mirs. As they sniffed the odor of cooking High Champion Giyt and Rina stared at each other with a wild surmise. "You don't suppose—" Rina began.

"Jesus, I hope not," said Giyt. But as they got out of their cart, Giyt gingerly holding his penance under one arm and the detonator in the other hand, they saw that there was food, all right, but of a more conventional sort. Most of the crowd was milling around a dozen huge and fully laden banquet tables.

"What do we do, Shammy?" Rina whispered. "We can't eat Kalkaboo food."

Giyt shrugged, grateful that at least they were apparently not expected to eat Kalkaboo. Where the crowd of mourners was thickest Giyt could see the intact body of the late High Champion, removed from its cooking pot and slowly cooling inside a glass-sided sort of coffin. Or fish tank, because it seemed to be filled with water. The High Champion floated submerged inside, eyes closed, arms folded over his chest, the great floppy ears stirring slowly in the water. He was nude. Apart from that, simmering in a stewpot all through the long Tupelovian night didn't seem to have changed his looks much. Next to the High Champion's tank were three large, covered pots, each with a Kalkaboo standing beside it as though guarding its contents.

The big question on Giyt's mind was what to do with his huge firework. Nearly every person present, at least a thousand Kalkaboos and a representative or two of each of the other races, had a firecracker of his or her own, though he didn't see any that approached the mass of his own monster. He wondered what they were planning to do with the things. It didn't seem sensible to set them off at random in this crowd. Especially his own mammoth one. And the question was becoming urgent, because he could see the sky already graying around the island's central mountain.

An elderly female Kalkaboo solved the problem for him. She came hurry-

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ing through the mob, made an expression of astonishment when she saw the size of what he carried, then beckoned him to follow her to a roped-off enclosure strewn with what looked like soft-boiled egg cups, in varying sizes, made of solid metal. Mourners were putting the larger firecrackers into the cups, and the largest cup of all, a hundred-kilo giant of fire-stained steel, appeared to be reserved for Giyt. When his burden was emplaced the female hurried him out of the enclosure and bade him stand just outside the rope. He looked around for Rina but she was lost in the crowd.

Then a drumbeat sounded. The crowd became silent, all turned toward the east and, just as the first edge of the sun popped over the mountaintop, the salvos began. Each Kalkaboo with a small firecracker tossed it into the enclosure. They exploded on impact. At first it was only sharp rifle-cracks as the smaller ones went off; then one of the Kalkaboos holding a detonator like Giyt's own pressed it. Then there was a larger blast, then a series of them, and then Giyt sighed and pushed the button for his own giant charge. Orange flame leaped up toward the sky. The concussion almost knocked him over, and the immense explosion nearly deafened him; and then it was over.

All the Kalkaboos around Giyt were looking at him, with expressions that might have been respect, or equally well could have been loathing. He glanced uneasily toward their waiting cart, but Rina firmly shook her head; it wasn't time to leave yet. After a moment the mourners began chattering among themselves, turning toward the tank that held the late High Champion.

The Kalkaboos standing by the pots had the covers off now, and one by one they raised their pots and dumped the contents into the tank. Giyt had a confused impression of something moving about in the fall of water from the pots, and then he saw what it was. Each pot had been filled with a dozen or more eel-like things, each a few centimeters long, and as soon as they were in the tank they went about the business of feeding on the stewed carcass of the recent High Champion.

Someone tapped him on the shoulder. He turned to see the female who was his guide, and she was speaking to him. He had to turn up his earpiece to hear her say, "They eat. We eat. You eat," demonstrating the translation program's skill at declining at least the simplest verb forms, as she urged him toward the buffet tables.

Well, Rina and Giyt didn't eat there, exactly, although they did nibble. The Kalkaboos were knowledgeable enough to have provided some human-edible cheeseburgers, bought frozen from the humán store, not quite knowledgeable enough to have defrosted them. The Giyts gnawed politely around the edges as best they could, but not for long. As soon as Giyt saw a chance they stole away, found their cart, and headed for home, where they dumped the remains of the cheeseburgers into the disposer.

By then Giyt's ears had stopped ringing, and enough of his hearing had returned to let him put in a little preparatory work at his station before

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heading for the weekly commission meeting. All the same, he resolved to do his best to avoid running up any more Kalkaboo expiation bills, however unfairly accrued. One of those monster firecrackers had been enough to last him. It was the sort of thing, he thought, that was better employed in blowing up tree stumps, or maybe demolishing small houses.

But, all in all, Giyt was fairly well pleased with himself. He had met the obligations of the situation with reasonable credit, and when he arrived at the Hexagon he was prepared to present his very first original proposal to the group.

He was early, but not as early as the Responsible One of the Petty-Primes or the Principal Slug, who were whispering to each other at the Slug podium. Mrs. Brownbenttalon arrived a moment later and greeted Giyt. "Hey, Large Male Giyt, you make good bang, eh?"

"Oh, were you there? I didn't see you."

"No," she agreed good-naturedly, "you much too occupied with hellish big bang. How you like dopey Kalkaboo funeral? After disgusting little snakes eat meat they burn decedent's bones, you know? And then lucky Kalkaboos each get one disgusting snake to keep for pet." She paused to listen as her husband muttered in her ear. "Oh, right. Listen. Tonight we do Miss Whitenose First Fuck party. You need to cheering up now, so you and mate come, OK? Now got to chair dumb meeting. Not to take long because we probably got to have dumb Kalkaboo ritual real fast."

"What ritual?" Giyt asked, staring after her, but she had already scuttled to her post at the Centaurian point of the Hexagon as the Delt General Manager arrived.

That was, evidently, as full a quorum as they were going to get. There was no one at the Kalkaboo podium, only a glass fishbowl that, Giyt saw incredulously, contained one of the eel-like things, torpidly swimming as befit a creature with a very full belly. Mrs. Brownbenttalon clicked one of her claws against the lectern and said, "OK, meeting called to order. You all got all reports, read when you feel like, nothing special, so move to accept, OK? Good. Now since there no other business—"

Giyt hadn't expected her to move so fast, but he was ready. "Madam Divinely Elected Savior Brownbenttalon," he called, "I do have some other business."

That stopped her for a moment. She peered silently at him over the fur on her long nose, beady little eyes blinking. "Mayor Large Male Giyt, have not available time at present time for necessary time for unknown other business."

"I'll just be a moment," he reassured her, and went right on. "What I want to talk about is a proposal for a joint six-peoples effort to make better use of the resources of Tu— of our planet. We could start with the possibility of finding useful new pharmaceuticals to return to our home planets. I am sure most of you have already surveyed the, ah, biota of this island and the ones nearby, and no doubt you've long since found many valuable substances. Unfortunately,

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my own planet has not been so enterprising, and we have a lot to do to catch up. But, unless I am mistaken—and I've discussed this with Mr. Hoak Hagbarth—none of you have actually conducted a similar investigation of the biota of the other island chains on this planet. Yet they may have things of great value. I understand that, because of the great distances, there has been little or no contact between the different island arcs since the time of the planet's K-T incident, and so their biota may be quite different from our own here." He glanced at his notes, taken from his time with the datafile earlier. When he looked up they were all staring at him. "It is a matter of relict populations and mutations," he explained. "The relict populations may be quite similar to our own—though there might be considerable differences because of differences in climate—but the mutations, which are quite random, will surely have produced many new species and varieties, perhaps even quite new genera." He paused, gazing at Mrs. Brownbenttalon uncertainly. "Am I going too fast for you?"

She made a noise that might have been a snicker. "Actually too slow, Mayor Large Male Giyt. Making great demands on patience of new Kalkaboo High Champion, who waiting for meeting end. Look, he entering now for ritual combat."

It was the first Giyt had heard of the ritual combat. He didn't know what she was talking about, but as the new High Champion came grimly in, followed by a dozen sullen-looking dignitaries of his community, it was all quickly explained. "Earth Human Mayor Giyt," the Kalkaboo announced, "you have caused the death of our beloved former High Champion, and as successor of same I must wipe out unendurable stain on Kalkaboo honor. Prepare self for combat!"

And he sprang at Giyt over the audience seats, floppy ears flopping, scrawny arms outstretched to claw at him.

Giyt had never thought of himself as a warrior, didn't like fighting at all, and had done very little of it in his life. Nevertheless, in high school he and every other student had had to take the compulsory martial-arts courses just to give them a fighting chance of making it home after class.

In any case, the Kalkaboos were not a large race; Giyt was twice the size of the new High Champion-elect. He ducked those grasping arms, bent, caught the eetie around the waist—his scrawny body was much hotter than Giyt's—and threw him two meters across the room.

The Kalkaboo yelped in astonishment, tried to get up, yelped again and lay there, clutching one shoulder and glaring up at Giyt. "Are Earth humans insane?" he whimpered. "What you did that for?"

"Jesus, Giyt," Hagbarth complained, "what did you do that for?"

Giyt protested, "He jumped me. Anyway, it was a fair fight."

"Asshole! It wasn't any kind of fight at all. It was just one of those damn Kalkaboo customs, for God's sake. All you were supposed to do was take a fall and let him claim victory—you

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know, to avenge what you did to the guy before him, so he could confirm his claim to the job—and then everything would've been fine."

Giyt blinked at him. "Take a fall?"

"Quit. Bare your throat. Tell him he won," Hagbarth explained. "Are you having trouble understanding that? That's what you should have done. But no, you had to make a real fight out of it. Jesus, man! I guess I'm lucky you didn't just kill him, too, and I don't think they've got a firecracker big enough for that."

XVI

Funeral services for Dr. Fitzhugh J. Sommermen were held today at Washington National Cathedral, after which his ashes were placed in the Great Columbarium in Arlington Cemetery. At the interment the President gave a short commemorative address, calling Dr. Sommermen "a true American hero, modest, dedicated and strong." The President added, "What this great man did for his country will live forever in the memories of all Americans, for it was he who opened America's pathway to the stars." Interestingly, almost none of the foreign dignitaries who had been invited for the ceremony attended.

—Earth news broadcast

A few months of being a public figure had done one thing for Evesham Giyt. It had taught him all the ways in which private was better. A public person had no hidden humiliations. They were all right out in the open and, in a community as small as Tupelo's, there seemed to be no person of any age, gender or species who didn't know all about Giyt's. Not that most people were hostile—that is, not counting the Kalkaboos, who unanimously froze him with silent glares of loathing at every chance. But most of the rest of the population, human and eetie, seemed to think the whole situation was just a pretty good joke.

It was a joke Giyt tired of pretty quickly. So, although Mrs. Brownbenttalon's party was within reasonable walking distance, Giyt called a cart to take them there. Walking would mean that passersby could say things to him along the way that Giyt didn't want to hear. He wondered briefly if they were still welcome at the Centaurians's. Rina, thrilled at the idea of a party, did her best to reassure him. "Don't sweat it, hon," she coaxed. "You made a mistake, but nobody warned you, did they?"

Nobody had. Least of all the one person who should have—Hoak Hagbarth; and one of these days, Giyt thought as they got out of the cart, he ought to talk to the man about that.

Mrs. Brownbenttalon's home was a lot more lavish than anything else Giyt had seen on Tupelo. As the official residence of the Centaurians' Divinely Elected Savior it was built on the grand scale. It consisted of four or five smallish but brightly colored one-story structures, connected by breezeways. Like an ancient Roman villa, the whole thing surrounded a pretty garden with a reflecting pool and a stand of bamboolike trees rustling against each other in the breeze. The whole thing looked more California than

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Tupelo to Evesham Giyt, and he was surprised to see how many guests were present. Ten or twelve of them were Centaurian matriarchs like Mrs. Brownbenttalon herself: another several dozen were their most favored husbands along with a fair number of young ones; but the mayor-equivalents of most—though, conspicuously, not quite all—of the other races were also on hand. The only Tupelovian race wholly absent was the Kalkaboos, and Giyt had a good idea why.

Miss Whitenose came to greet Rina and Giyt as they got out of their cart. It was her party, and she was enjoying being the center of attraction. "Most excellently nice you come," she said. "You eat something? Good Centaurian edibles here, all checked by Ex-Earth chemists many long times since, quite OK for your species to process and excrete." She clicked her front talons together without looking over her shoulder. Immediately two or three males leaped forward bearing the sort of bamboo joints, sealed at both ends, that Giyt had seen at the firemen's fair. Miss Whitenose took the two largest, held them to her ears for a moment, then expertly opened one end of each and offered them to the Giyts. "Dopey Earth human meal-handling utensils," she said to the air, and two more males eagerly proffered tapered ceramic spoons. "You eat this excellent provision," she ordered.

The joint was warm, and when Giyt sniffed at its contents they smelled faintly Italian—some kind of Parmesan-like cheese, he guessed, though as far as he knew Centaurians kept no dairy animals. He glanced at Rina, who smiled at him, dipped her spoon into the open top of the joint and tried it out. "Oh, nice," she said appreciatively. "Give it a try, Shammy. You'll like it."

As a matter of fact he did. What was inside the bamboo joint was a sort of pudding, the texture of an avocado but with crunchy little sticklike things in it. It tasted, as much as anything, like a well prepared risotto, with a few spices he could not identify.

"Delicious," he said. Miss Whitenose nodded graciously.

"I tell you this already," she said, and clicked her talons again. Whereupon the hovering males dashed away to a row of cooking pots, returning to their task of helping other males boil up additional segments. Miss Whitenose didn't look after them but made a soft, snickering noise. "They new husbands just purchased for me," she explained proudly. "Work asses off, hope to be picked for great honor of to be first to do me. Now come meet other guests."

She led the way to where Mrs. Brownbenttalon was holding court, reclining on an elevated cushion and chatting with five or six other beings at once—a pair of other Centaurian matriarchs, plus two half-grown females younger than Miss Whitenose, and several members of other races. Giyt recognized the Principal Slug, the Delt General Manager and the Petty-Prime Responsible One and his wife—well, one of his wives, anyway; Giyt was not very clear on Petty-Prime mating customs.

To his surprise, the tiny Responsible One climbed up on one of the

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seats and thrust his paw toward him for a handshake. "Excellent see you, Earth Mayor," he piped. "Interesting combat this day at meeting."

Giyt swallowed a spoonful of the pudding. "I can explain—" he began.

"What explain? You bitch damn Kalkaboo up, about time. Make too goddam much noise every dawning, get sick and tired of it."

"Have awful bad breath, too," the Principal Slug said—or slurped; Giyt could hear the slushy, wheezy sound of his voice even above the translation in his ear.

And Mrs. Brownbenttalon said: "Kalkaboos pissed off in major way now, you know. Won't come Miss Whitenose First Fuck party because you here. Who care? Of course," she added casually, "now they tell everyperson you trying steal everyperson private secrets, take good stuff, send home to Earth-human planet."

That made Giyt blink. "Are you talking about the proposals I made at the Commission meeting? But that's not what I was suggesting at all. I simply proposed that everybody get together, all six races, and make a systematic survey of what this planet has to offer. I'm sure we'd find resources that could be exploited for everybody's benefit."

"Yes, idea is quite preposterous, have understood completely," Mrs. Brownbenttalon agreed, and the Petty-Prime said:

"Preposterous, naturally, but also very sweet. Obviously are being quite kindly person, Earth Mayor Giyt. Too bad so ignorant."

It was Rina who rescued Giyt from that conversation; they had to circulate, she said, and they circulated. A couple of sub-adult Centaurian males were beating softly on sacks of something or other that gave off a muffled sound—not a very pleasing sound to Giyt's ears, but at least Centaurian music wasn't loud. The Giyts paused by the refreshment tables, studying the contents. Rina ventured to try what appeared to be a canapé—a sort of pale lavender rosebud, capped with a dab of what looked like brown sugar—but grimaced at the first bite and looked for a place to put it down. Giyt accepted a bamboo tube of something to drink from an eager male servant; it was more like prune juice than anything else, but mildly alcoholic and not too awful to drink. He was still brooding over the conversation with the others. "But I was only suggesting mutual cooperation," he muttered in Rina's ear, and she shook her head.

"We'll talk about it later, Shammy, OK? This is a *party.* And, look, I think the bride is about to make a choice."

At the center of the atrium Mrs. Brownbenttalon had moved over on her dais and her daughter had joined her. The two females whispered to each other, glancing and pointing at one or another of the prospective bridegrooms, all of them belly-down on the ground before the dais, their eyes closed and their whole bodies quivering.

There was a ritual to the selection process. Miss Whitenose was juggling a mittful of objects—some ordinary pebbles and one of those lavender

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rosebuds. After a considerable amount of whispering with her mother she abruptly tossed one of the pebbles at a male, who turned and crept mournfully away. Another pebble; another disappointed suitor. Then when only one was left, she threw the rosebud hard and clean at the remaining one, who yelped in joy, leaped up onto the dais and burrowed into the curls of her fur.

Giyt glanced wonderingly at Rina, who returned his look; but after a moment of applause from the audience Miss Whitenose gracefully came down from the dais and headed for one of the smaller buildings. Mrs. Brownbenttalon turned to Giyt, making a cackling kind of laughter. "I know what you think," she said. "You think she going do it right in front of us, correct? But no, not at all, young couple don't need bunch people hanging around staring at them when they do all-important first fuck. Take mind off serious business they busy at, you see? But we naturally got cameras in private doing-it room, keep record in family database so children can someday see actual impregnation which produced selves. You Earth humans do similar ritual, wedding album thing, right? So everybody come along, we observe performing on the TV!"

When the party seemed to be ending the guests lined up to take their leave of Miss Whitenose—no, Giyt realized, she was Mrs. Whitenose now, a full matriarch in the Centaurian community. Giyt absently joined the end of the line, Rina's hand in his. At least one question had been settled. He had wondered how somebody the size of Mr. Brownbenttalon was able to stick it to somebody the size of Mrs. Brownbenttalon, but the TV screen had given him the answer. It turned out that the biggest part of a Centaurian male was his sexual organ. Like a whale's, it was invisible in normal life, because he kept it rolled up inside him until needed, but then—

He stole a glance at Rina, and was not surprised to see that she was wearing a faint, contemplative smile. "Jealous?" he murmured.

She blinked and looked up at him, but before she could respond Giyt became aware that something was tugging at his trouser leg. It was Mr. Brownbenttalon. "You don't go yet," he whispered. "Honored wife say please you stick around, we talk on assorted subjects, get to know each other better, OK? Just have patience few ten minutes while junior males and kids clean up."

So the Giyts dropped out of the line and sat quietly, watching the cleaning-up procedure. One of Mrs. Whitenose's lesser husbands brought them stalks of the pruney beverage and offered more of the foods. Rina declined hers. "Shammy, hon? Mr. Brownbenttalon invited me to look at their kitchens," she said. "All right if I snoop around a bit?"

"Snoop away." Giyt comfortably sipped from his bamboo tube—yes, the liquid definitely was alcoholic—while he watched her chatting with the males and subadult females as they bustled around cleaning up. The whole household was busy. One group of males was burning the de-

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bris, another thriftily carrying away the uneaten food, a third sawing sections from the stacked bamboo stalks. Giyt wondered absently if their own child would be as helpful around the house. Then he wondered what it was going to be like to have a child in the house in the first place. He hoped the de Mirs would stay on as neighbors. That way their own child would have playmates right next door, and teenage baby-sitters handy when they reached that point. . . .

A voice piped in his ear: "Are you being done OK, Large Male Giyt? Plenty food, plenty beverage? You want more, easily got." Giyt turned to see Mr. Brownbenttalon gazing up at him, his little claws poised to click for service. Giyt forestalled him.

"No, I'm fine." He thought for a moment, then decided it was a good time to apologize. "Listen, I'm sorry if my being here kept the Kalkaboos away."

Mr. Brownbenttalon reared back on his hind legs, snout elevated toward Giyt. He was hissing faintly in embarrassment. "Please!" he begged. "Extreme discourtesy to revered wife if have substantive talking in absence of her beloved presence, OK?"

"Well, of course, but I only meant—"

"Please! All right discuss weather, extreme handsomeness of Mrs. Whitenose new husbands, unpleasant odor of Delts, sports events. Things that nature. Not thing of significance."

Giyt sighed. "Sure," he said. And when all the things of no significance had been used up Mr. Brownbenttalon was satisfied. He went away, furiously clicking at the way the lesser males were doing their housekeeping.

Giyt was content to be left alone. He found talking about nothing hard work. Being abandoned in solitude wasn't all that much better, though. It gave him time to reflect on his numerous blunders, and about what sort of unforeseen unpleasantness was likely to strike next, and most of all about the—not unpleasant, but certainly *worrying*—fact of Rina's pregnancy. He wondered if the excitement of the party was really good for her. There was no point in asking Rina about it, of course. She would just laugh at him. Fondly, to be sure, but still—

He heard her call his name and saw her threading her way among the busy male Centaurians toward him. She had a bamboo segment in her hand and a faintly startled, mostly amused expression on her face. One of the younger Centaurian males was tagging patiently after her. "Look at this, Shammy," she ordered.

He took the piece of bamboo in his hand, turning it over. It seemed to be filled with some green, pith-like plant substance; but—

He yelped and almost dropped the segment. The Centaurian male darted quickly in to catch it and scuttle away. "Did you see?" Rina asked. "That little thing like a lizard in it? The cook just took it out of a cage and put it in there; now he's going to cap it off with the lizard-thing inside. And then, when it's eaten everything, they boil up everything that's left in the tube."

Giyt felt his stomach go queasy. "And that's what we've been eating? Lizard shit?"

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"Well, that's one way to put it," she admitted. "Tasted good, though, didn't it?"

Giyt was spared answering because Mrs. Whitenose appeared. You could not say she was sprightly—that sort of step did not go with the low-slung Centaurian anatomy—but there was something self-satisfied about the way she moved.

"Thank you to wait so long," she said. Giyt caught a glimpse of two little eyes peeping out of the fur on her back: her new husband, silent, perhaps exhausted from his recent efforts. Mrs. Whitenose added: "My mother asks you come talk a bit now. Present moment is time of feeling-good relaxation. You know saying about parties? Extraordinarily delighted see guests come, even more extraordinarily delighted see them go away again—but, listen, not meaning present company, of course."

Mrs. Brownbenttalon was lying comfortably on a mossy mound of earth, with her main husband now affectionately grooming the fur above her eyes and a lesser husband pouring little glass cups of a beverage for the guests. When Giyt took a sip he almost choked; this wasn't the juice he'd had before. It was distilled, had to be close to a hundred proof, and not bad.

Mrs. Brownbenttalon was solicitous. "You like? This good stuff. Don't serve at party, guests get too rotten drunk, make fights, especially stinky Slugs."

"Also Earth human Large Male Hagbarth," Mrs. Whitenose put in.

"Oh, yes, bad guy, Hagbarth. When he here he awful, you know? He act like he think he hot waste product. Very contemptuous of races wiser far than, excuse me, Earth humans. We do not do that way. Our practice is always judging individuals not races, even stinky Kalkaboos," she said largely. "You OK Earth human, Large Male Giyt. We think."

"Well, thank you," Giyt said, looking around. More Centaurians were showing up as their chores were finished, lesser males and sub-adults, silently congregating at a respectful distance around the matriarchs to listen.

"You are welcomed. Well, what about party? Have good time? You like food?" When both the Giyts expressed admiration for the food, she bobbed her long nose in agreement. "Always good have plenty fine food. When Pentagon is full, bellies fill themselves."

"Pentagon?"

"Sure, Pentagon. That what you Earth human call building with five sides," she instructed him. "Is place where us five Divinely Elected Saviors on Joint Governance Commission congregated before large-male Earth humans arrived. Much debate about what do with you guys when you dumb little machine ship arrive, you bet!" she said, cackling. All the males and children cackled too; only Mrs. Whitenose, seemingly lost in a dreamy reverie, was silent. "Then decided purpose of peace-treaty planet was to learn peace, right? Needed for survival of rest of us? Probably needed for survival with you large-male persons, too, so voted in, no dissent."

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The male on her back giggled and squealed, "*Much* dissent, actually." But Mrs. Brownbenttalon reached up with her hind leg and swatted him amiably.

"Not dissent," she corrected. "Discussion, of course. For many days—Slugs objected at first, too many vertebrates—but finally unanimous. So sent you guys portal thing so you come here."

Giyt frowned in surprise. "You *sent* the portal?"

"Of course sent portal. What else?"

"But—Professor Sommermen—"

"Ah," she said, her snout wrinkling in comprehension. "That large-male Earth-human guy—what he just do, Mrs. Whitenose?"

Addressed, her daughter roused from her fond daydream. "He die."

"Sure, he die. Remember myth now. Like Santa Claus, you know? Like myth of non-Earth people persons coming to Earth planet in crockery dishes, abducting Earth humans for sexual games."

"Yuck," said Mrs. Whitenose.

"Yes, typical Earth-human myth," her mother said. "Bizarre but very sweet. You didn't know?"

Giyt glanced at his wife to see how she was taking all this. Better than he was, he thought. She looked interested and amused. Doing his best to control himself, he said, "I'm sorry, but I don't know what you're talking about. Didn't Dr. Sommermen invent the portal?"

"Him? Large-male Earth human? Invent portal?" She was giggling at the idea, and so were her husband and daughter. "No way! Take damn good wizardly science knowledge for building portal, you don't have. Can't get, either," she added complacently, "because portal constructed so you guys can't open up, else biggest damn bang ever. Of course, now all are most glad your people are here," she added hospitably. "Most your people, anyway."

"Not counting Large Male Hagbarth, we mean," Mrs. Whitenose put in.

Giyt didn't know what sort of expression his own face was displaying until he saw the way Rina was looking at him. She patted his shoulder. "Don't take it so hard, hon," she said.

It was certainly good advice. The trouble with taking it was that he was indeed hard hit. Giyt did not think of himself as a naive person. He was not startled to learn that people in power told lies.

But this lie? What was the point of it? Only out of some kind of Earthie vanity, that did not want to admit to the rest of the human race that somebody was smarter than they?

Mrs. Brownbenttalon was still talking. "You come to all-six-race confabulation talk in Hexagon when it begin," she advised. "When people from all home planets meet here, you know? Good thing. You learn much. Also big pain, because they scoot us all the hell out of said place, but this cannot be helped. No Joint Governance Commission meeting possible then because place full of Peace Treaty people. You know Treaty of Perpetual Peace document yourself?"

"I'm afraid not," Giyt admitted. "There's been so much I had to catch up on."

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"You do! Most important. Peace Treaty is reason Peace Planet exists. Very tedious document, sure, but very important. Is in database, and very valuable for survival. With treaty now persons, husbands, and young on home planets live in security, no more wars."

"Old times of war *horrible,"* Mrs. Whitenose squeaked. "Much destruction, cities in ruin."

"But long, long ago, even before us great ancestors born. And all repaired now," said Mrs. Brownbenttalon. "Home planet completely restored to state of great beauty and prospering, not counting radioactive waste areas."

"It must be a wonderful place," Rina said politely. "I'd love to see it."

"Never happen," Mrs. Whitenose said positively, and her mother gave her a reprimanding look.

"What Mrs. Whitenose mean," she said, "is of course humans don't come to Centauri planet, Centaurians don't come to human Earth planet, not ever. Meet only here. Much better that way."

"Had experience of other races visiting our planet," Miss Whitenose said, shaking her pointy nose. "Other races come first in dumb little fire-squirting rocket ship thing. I am talking Slug here, you understand? Long, long, long ago. At first all friendliness, talk trade, talk friendship, talk all kinds animal excrement stuff but don't mean; come next time in battle fleets, you know? Bang-bang-bang bombing, shooting, killing. Very much killing in which many, many persons die, also males. No good. Know better now. You stay your place, we stay our place, everybody happy."

"And no shooting," added Mr. Brownbenttalon.

XVII

The armistice treaty agreed to by the Centaurians and the Slugs (who, of course, were also Centaurians, which somewhat confused earlier researchers) was so complete in spelling out the conditions of peace between the two extraterrestrial races that, as the so-called "Treaty of Perpetual Peace," it became the document which all subsequent species signed.

Under the Peace Treaty all signatory species agree, in painstaking detail, to refrain from attacking each other and to eliminate all weaponry on any spacecraft approaching within 356,803 kilometers (so the translation reckons the units of the original draft) of any signatory's planet. The signatories further agree that the Peace Planet (known on Earth as Tupelo, the name given to it by the original exploring team at Huntsville) was to be perpetually disarmed, with no weapons of any kind except the equivalent of bug sprays and mechanical flyswatters. That was all the significant parts. The rest was codicils, four of them, of which the one for Earth was most recent, admitting the other arrivals to the original compact subject to the same provisions as for Centaurians and Slugs.

—Britannica on-line, "Tupelo"

The morning after the Centaurian

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party Giyt took Mrs. Brownbenttalon's advice. As the translated text of the treaty scrolled through his screen he whistled to himself. "No weapons of any kind" obviously meant no weapons at all. What had Hagbarth been thinking of with his nonsensical application to bring guns in? And, for that matter, why hadn't Hagbarth warned him about Kalkaboo customs? Or that his proposal for jointly exploiting Tupelo's resources with the eeties would be laughed down?

Obviously Hagbarth was deliberately withholding information that Giyt needed to do his job properly. Why? Was he just intent on making Giyt look bad? And if so, what was the reason for that?

And, thinking of information withheld, what about Mrs. Brownbenttalon's little bombshell concerning Professor Sommermen and the portal?

He attacked the system again, but there was nothing new about the portal to be found on a quick search. He sighed, and prepared to dig deeper. He created a scout program to dig through the whole huge database for conjunctions of key terms, wherever they might be found. But by the time the Kalkaboo morning barrage told him it was sunrise nothing useful had turned up.

He showered and dressed distractedly, sat distractedly down to the breakfast Rina had made for him. She looked at him quizzically. "Are you all right, Shammy? Not hung over from last night?"

He blinked at her, mildly indignant. "I didn't have that much to drink, did I?"

"Of course not, hon. You just seem a little down. It isn't still that business with the Kalkaboos?" When he shook his head she changed the subject. "Shammy? Do you mind if I leave you alone for a while today? It's Lupe and Matya. Today's their anniversary, and they've got this kind of romantic idea. They want to go off for a picnic in the woods without all the kids around. So I promised I'd baby-sit."

"Sure. I'll be fine."

"You're positive? Because I could bring the little kids over here after I get the others off to school—"

That got his full attention. "No, no, that's all right. Should you be doing all that in your condition, though?"

She beamed fondly at him. "You're sweet, Shammy, but I'll be fine. I love my condition, and you know what? I love you, too."

Giyt was just sitting down to his terminal again when he heard someone at the door. It turned out to be one of Mrs. Brownbenttalon's lesser husbands. He was carrying a package, as big as himself, that was wrapped in a shimmering silklike fabric, decorated with flowers. Giyt scrambled to find his translator button and put it in his ear, just in time to hear the little creature say, "Object is freely given gift for enjoyment of you from honored wife and also from highly esteemed principal daughter. You observe have cart vehicle waiting? Reason for waiting of cart vehicle is must return quickly to home for urgent household duties." He expertly detached a tiny record plate from the package and held it out for Giyt. "Sign signature for gift, please?"

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Giyt pressed his thumb on the glassy section of the plate and scrawled his name over it, surprised and pleased. But as the Centaurian was getting into his cart another cart was pulling up behind it, and the good feelings evaporated as Hoak Hagbarth got out.

Hagbarth scowled curiously after the departing cart, but if he had something to say about it Giyt didn't give him the chance to get it out. "Hagbarth, why is everybody lying about the portal?" he demanded without preface.

The expression on Hagbarth's face changed in a way Giyt had never seen before. The scowl didn't go away. If anything, it deepened, but at the same time Hagbarth's pale eyebrows went up in incredulous shock. "Oh, God," he moaned, "what is it with you now, Giyt?"

"You know what I'm talking about. The portal. Sommermen didn't invent it. It was given to us by the eeties. I want to know why that's been lied about."

The frown and shock melted away from Hagbarth's face, leaving only polite incredulity. "It was?"

"Of course it was. Mrs. Brownbenttalon told me about it herself."

"Oh, right. You were at her place last night, weren't you? How'd you like it?"

"Look," Giyt said. "We're not talking about the party. We're talking about why Ex-Earth tells everybody the portal was Dr. Sommermen's invention when it wasn't."

"Well, now how would I know that? Be reasonable, Giyt. I just work for Ex-Earth, they don't tell me any secrets."

"But you must know *something.*"

"No I mustn't. I don't, and that's all there is to it. Aren't you going to open your present?"

It was a standoff. Clearly if Hagbarth did have any information he wasn't going to share it with Giyt, who surrendered and began to unwrap the package. It turned out to be half a dozen of the bamboo segments Mrs. Brownbenttalon had served, and Hagbarth's scowl was replaced with a look of revulsion. "Oh, Christ, look what they're giving you! It's some of that damn lizard shit."

Whether Giyt agreed with the sentiment or not he felt obliged to defend his hostess. "Actually, it's not so bad. We had some last night."

"Oh, yeah. You were going to tell me what went on there."

Actually, Giyt hadn't intended to tell the man anything at all, but there was always the chance that if he kept on listening to Hagbarth the man might involuntarily tell him something useful. He said, "I guess you'd call it a kind of comihg-out party for her daughter."

Hagbarth nodded wisely. "Yeah, I know those Centaurian parties. Pretty damn boring and lousy food, right? Mrs. B. used to invite me and Olse now and then, but, you know, they're eeties, aren't they? They have their ways, we have our ways. I'm not saying our ways are *better,* but still. Anyway, we really couldn't stand being around the company. Did anything interesting happen while you were there?"

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"Well, the Kalkaboos didn't show up—because I was there, I think." He waited to see if Hagbarth would take the opportunity to remind him what an idiot he was for injuring the new High Champion, but all the man said, impatiently, was: "Sure, sure, but what did you talk about?"

The trouble with asking questions of Hoak Hagbarth was that it always wound up with Hagbarth asking all the questions. Giyt was getting tired of the one-way conversation. He said vaguely, "Oh, different things. Look, I think I ought to put this stuff in the fridge."

What he was hoping was that Hagbarth would take the hint and leave, but the man only followed him into the kitchen, laughing. "Why bother? What could happen to it to make it any worse? Anyway, you were telling me about what you talked about at the party."

Giyt cast about for subjects he might want to let Hagbarth know about. The way the other races had seemed to despise the Kalkaboos? But he didn't really want to mention Kalkaboos to Hagbarth. What Mrs. Whitenose had said about Hagbarth himself? That was almost tempting, but Giyt decided on a neutral subject. "They were telling me about the war they had with the Slugs, long ago. Did you know about it?"

"Well, sure. Must've been a real donnybrook, nuked each other's planets, killed off millions of people on both sides. Did they say anything about the kinds of weapons they used?"

Giyt searched his memory. "Nothing specific, no."

"Well, they started out with old-fashioned rocket ships—the Slugs and the Centaurians are in the same solar system, you know. Then they got high-tech, but they don't talk much about that. You know," he said, sounding indignant, "it wouldn't hurt them to be a little more open with us. We haven't hidden anything. Anything they want to know about Earth, we tell them—well, mostly we do, anyway. And there are a lot of people back on Earth that think we haven't been getting a fair shake from them, that way."

Giyt nodded and shrugged at the same time—the nod to indicate comprehension, the shrug for well, what can you do about it? Hagbarth was silent for a moment. Then he said abruptly, "Oh, listen, I almost forgot. I came here to talk to you about something."

Giyt gave him a suspicious look. "The portal codes?"

"Well, that, too, but I guess you would've told me if you had them for me? Yes, that's what I thought. No, what I wanted to tell you was Lieutenant Dern wants you at the firehouse today after siesta."

Lieutenant Dern was the operations officer for the fire company, so Giyt was pretty sure he knew why. He asked the question anyway. "What for?"

"Training, and I think she's going to pull a quiz on you, too. Have you been studying?"

"Well, not really—"

Hagbarth grinned at him. "So then it's a good thing you've got a couple of hours, right? And listen, if I was you I'd just pitch that bamboo crap in the

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garbage; Mrs. B. will never find out."

So that meant one more burden on Giyt's suddenly insufficient time. There wasn't any help for it. Resigned, he gave up the notion of doing a little more digging into some of the things he really wanted to know and got down to the business of studying.

The list of things a fireman was supposed to know was formidable. There were the schematics of the pumpers and the water cannon to learn, the theory of putting fires out to study (cool them with water, smother them with foam), the proper names of every air-pack and peavey hook in the company's arsenal to memorize. It wasn't any more difficult than any of the college assignments Giyt had easily aced long ago. He had educated himself in far more complex subjects many times, for school or just for the pure pleasure of learning. This stuff was child's play compared to, say, identifying Napoleon's order of battle as he marched on Moscow, not to mention some of the more abstruse areas of network theory. If this one was a burden it was primarily because it was compulsory, had been most unjustly dumped on him without warning. And what did it matter whether he passed Lt. Dern's quiz or not? What could they do to him?

So, having established that there was no good reason requiring him to cram for the test, Giyt did what he always did. He began to study, and he made good progress by the time he had to leave the house.

On the way to the firehouse Giyt stopped in at the house next door to tell Rina about Mrs. Brownbenttalon's gift. He had to whisper, because one of the littlest kids was asleep in a bassinet by her feet, while Rina was trying to feed another in a highchair. Out in the yard, where Rina could keep a watchful eye on them through the open door, the rest of the de Mir get was playing raucously with a bunch of Petty-Prime little pink kits. "That was nice of the Brownbenttalons," she said absently, aiming a spoonful of mush at the momentarily open mouth and expertly connecting. As he left she added. "Shammy? I'm glad to see you making some friends."

On the way to the firehouse Giyt wondered if that was what he was doing. He hadn't had much practice at making friends. For that matter, he hadn't even had very many acquaintances, back in Wichita, because every person who knew who Evesham Giyt was was a potential threat to his carefully secured lifestyle. Well, and because he hadn't much wanted any, either, he admitted to himself. The company he liked best was his own.

And, of course, Rina's.

As he entered the firehouse, the first person he saw was Lieutenant Grazia Dern. She was definitely not a friend. She had already let Giyt know, pointedly, that she was very close with the former mayor, Mariam Vandersehn, and thus not too friendly to her replacement. The only other fireman present at that moment wasn't a good candidate for friendship, either, since he was the man who had been turned down for permanent family re-

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location to the polar factories—Maury Kettner.

Giyt's training for the day turned out to involve a lot of hands-on practice, some enjoyable, some not much fun at all. After half an hour in the station Giyt thought he would never want to reel up a hose single-handed again, but then Kettner took him out into the field. It got better then. Kettner let him drive the truck around the fringes of the lake to the foliage on the far side. That was interesting in itself, and then Kettner let him fire the water cannon at the brush along the roadway. That was pretty much pure pleasure: all that power under his hand! They had gone all the way down to the riverside below Slugtown before Giyt realized his "training" had served another purpose: under Kettner's guidance his driving had widened a stretch of that horrible downhill road by a couple of meters on either side.

He didn't mind. He didn't even mind the stowing and draining after twenty minutes of blasting holes in the foliage along the banks of the foul-smelling stream, where one of the great cargo submarines from the Pole floated half-submerged, waiting to be unloaded. But then, when they got back to the firehouse, the lieutenant was gone and Chief Tschopp was waiting to give him spot oral quizzes on what he had learned in his screen session.

That wasn't what Giyt wanted at that moment. He was wet and sweaty and his arms were tired from holding back the kick of the water cannon. What he wanted most of all was to go home and take a shower. He didn't do well on the quiz, and when Hoak Hagbarth strolled into the middle of it Giyt looked to him for a diversion.

It didn't work that way. "For Christ's sake, Giyt," Tschopp exploded. "Pay attention!"

"He don't catch on real fast, does he?" offered Maury Kettner, watching.

"He does not," Tschopp agreed in disgust. "What's the matter, Giyt? You too busy playing those little bedtime games with your lady to study?"

That was going farther than Giyt was prepared to accept, but as he was tensing to reply Hagbarth cut in. "Now, now," he said mildly, "watch how you talk about somebody that's about to become a mother, Wili. Come on. Tell Evesham here you're sorry." Tschopp looked rebellious, but muttered something that might have been an apology. "Now, that's better. Are you through with the mayor? Because I need to talk to him about something."

He didn't wait for an answer, just jerked his head toward the chief's office. As the two of them entered, Giyt asked, "How did you know Rina was pregnant?"

"Oh, hell, Evesham," Hagbarth smiled. "Everybody knows everything around here, didn't you know that? Except about the freaks. They keep a lot of secrets from us." He closed the door on the man who was the office's rightful occupant. "That's what I wanted to talk to you about." He reached into his pocket and pulled out a ring, set with a topaz—obviously fake—the size of a pigeon's egg. "There's a recorder in the stone, Evesham. What I'd like you to do, I'd like

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you to just wear it next time you see Mrs. B., and maybe get her to talk a little more about what armaments they've got—"

"You want me to spy on her?"

"I wouldn't call it that, exactly," Hagbarth protested. "Just for archival purposes, you know? And it's not that we want to know anything they shouldn't be willing to tell us anyway—"

"No."

Hagbarth looked at him incredulously. "You don't mean that," he said.

"Actually I do."

"Christ, Giyt, where's your patriotism? You could be doing yourself some good, too. You can bet the eeties know everything there is to know about Earth—who knows what kind of spy stuff they had in the drone they sent the portal in? I mean," he added hastily, "if they did do that, like they say. And we've never got a ship near any of their planets. Hell, we don't even know where the Kalks and the Petty-Primes come from! And the scout ships the Huntsville people sent to Alpha Centauri and Delta Pavonis never even reported back—I give you one guess why."

Giyt frowned. Put like that, it sounded damning. But he said firmly, "Mrs. Brownbenttalon's a friend, and I don't do that to my friends. I'm not going to rat her out for you."

Hagbarth looked him over in silence for a moment. Then he sighed.

"So we might as well get out of here," he said. "I guess your principles do you credit."

But Giyt was quite sure he didn't mean it. What Hagbarth meant, what the tone of his voice said for him, was, *I'm going to remember this.*

XVIII

The star Delta Pavonis, which at a distance of some eighteen light-years is one of our Sun's nearest neighbors, has long been known to have planets, some of which were suspected of bearing life. That is why the extrasolar exploration team based at Huntsville, Alabama, directed one of its first probes toward that system. That probe was lost. (So was the one directed toward Alpha Centauri.) It wasn't until the first humans arrived on Tupelo that it was confirmed that planets of both stars did in fact possess civilizations.

The Delts—as the species from the Delta Pavonis planet are called—are structurally similar to humans, although their triangular skull and independently operating eyes give them a rather bizarre appearance. Biochemically, however, they are quite different. Sulfur is a major constituent of their chemical makeup and their diet, which has an unfortunate effect. Sulfur compounds are notoriously among the most malodorous of chemicals.

—Britannica on-line, "Tupelo"

Sure enough, Hagbarth didn't forget. It didn't take him long to show it. He appeared on Giyt's doorstep with a record pad in his hand. He looked both surly and impatient. "Jesus, Giyt," he said, "did you forget the mayor has to sign off on new housing? I've got these places to put our people in for the six-planet summit, and I

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can't let them be occupied until you do your job."

Giyt knew that. What he didn't know was why Hagbarth had come over in person when he could perfectly well have used the net. He signed in silence and handed the plate back to Hagbarth. "Thanks," Hagbarth said, but he didn't leave. He eyed Giyt without speaking for a moment, then said, "I don't guess you've changed your mind."

"About wearing your spy ring? No."

"All right," Hagbarth said, apparently doing his best to sound reasonable. "Then how about this? How about showing me how to listen in on Mrs. B's private transmissions? You could do that the way you did with the Petty-Primes, right?"

"I could. I won't, though."

"Come on, Giyt! I'm not asking you to do it for me personally! It's for all of us. The Centaurians and all the other freaks will be sending reports back to their home planets. Who knows what they're really up to? If we could just get a look at what they're saying to the people back home—"

Giyt shook his head firmly. "No."

"Christ, Giyt," Hagbarth's tone was filled with both anger and disgust. "Maybe I've misjudged you. You sure don't live up to your stats."

Giyt felt a warning tingle. "When were you looking at my stats?

"I've been looking at a lot of things, Giyt. It's a funny thing, though. There's not much documentation for you."

And how did you know that? Giyt asked, but not out loud. Anyway, he was pretty sure he knew the answer. From his base on Tupelo Hagbarth didn't have the facilities to make enough of a search in Earth records to be inconvenient. There was only one other possibility. Someone on Earth had done it for him. Giyt shrugged warily. "There's been some sloppy record-keeping, I guess."

"Sure," Hagbarth said, heavily sarcastic. "Or maybe somebody not so sloppy messing with the records? Somebody who's pretty good at tinkering with the net? It doesn't matter, though. There wasn't much on you, but there was a pretty complete datafile on your wife. The lady's had a really unusual career, hasn't she?"

Evesham Giyt did not have much experience of anger; he had arranged his life so that there weren't many occasions for it. Now he felt it, and felt it more strongly than he ever had. He kept his voice controlled. "What are you trying to tell me, Hagbarth?"

"I'm telling you that I'd like the two of you to be a little more cooperative, that's all." Hagbarth's expression was now smug; the son of a bitch was beginning to enjoy himself.

Giyt chose his words with care. "The thing is, Hagbarth, we just don't like cooperating with scum. Do you understand me? The answer is still no."

The smugness disappeared from Hagbarth's face; they locked eyes. Hagbarth was the first to break away.

"Ah, Giyt," he sighed, "What's the use? Just remember, I tried to warn you."

As Rina had reminded him, Evesham Giyt had never had many friends in his days on Earth. But there was an-

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other side to that coin. He hadn't had any enemies either, or at least not any who knew where to find him. While here on Tupelo he definitely had acquired at least one enemy, and one who was prepared to work at it.

Giyt got confirmation of that when Rina came storming back from the neighbors', her face dark with unexpected anger. "Have you been watching that bitch Cristl's show on the net? Well, you better take a look. Go back to about twenty minutes ago." And when he had backtracked to the beginning of the woman's call-in show there she was, Silva Cristl, wearing her fire-lieutenant's uniform with the jacket unbuttoned enough to show her cleavage, smiling into the camera. Her caller's face was pic-in-pic below her, and Giyt recognized him at once: Maury Kettner, the man who had wanted to move his family to the Pole and been turned down.

Only, according to what the two of them were saying on the screen, he hadn't been: "—we'll certainly miss you around the firehouse, Maury."

"I'll miss you guys, too," Kettner said, flushed with the importance of being on the net, "so I just wanted to say good-bye for a while to all my friends. And to say thanks to Mr. Hagbarth, while I'm at it. He really came through for me, so I and the family are on our way to the Pole. No thanks to the mayor, you know. I must've asked him a dozen times, and he just wouldn't do a thing."

"I know what you mean." Cristl was grinning too. "I hope he's a better fireman than he is a mayor."

"Well, you'd lose that one," said Kettner, chuckling as he disappeared for the next caller. The little picture showed a middle-aged woman, faintly familiar; Giyt thought maybe she was one of the ones he'd seen on Energy Island. She had criticisms of her own:

"Listen, I heard what Maury was saying about the mayor, and he's damn right. You know what this Giyt did to the boss Kalkaboo, don't you? How's that going to look, when all the big shots come here for their meeting? I have to say I really miss Mariam Vandersehn."

"Well, there'll be another election one of these days," Cristl said consolingly.

"Yeah, and the dumb voters just might put Giyt right back in."

"Well," said Lt. Cristl, pursing her lips in a knowledgeable expression, "I don't know if you have to worry much about that, sweetie. There's a lot that hasn't come out yet, take my word for it, and not just about Giyt himself, either. Now let's go to the next caller—"

That was enough for Giyt. He clicked it off while Rina protested, "They're being so *unfair!*"

"It's not a fair world," Giyt said absently, thinking about something he didn't want to say out loud in Rina's presence. And, of course, Rina's next remark was right on that subject.

"What do you suppose Cristl was talking about, stuff that hasn't come out yet?"

Giyt didn't answer her for a moment. He was wondering just what Hagbarth might have found out—and, even more, how Hagbarth had known where to look. He said, "I sup-

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pose we'll find out sooner or later."

It wasn't later. In fact it was a good deal sooner than Giyt had expected. Rina had hardly returned next door to practice parenting on the de Mir kids when she came flying back. Both Matya and Lupe were with her, carrying the smaller children; Matya looked indignant, Rina wore anger and unhappiness, and Lupe seemed to have been crying. "Shammy," Rina said, "I don't know how to tell you this, but somebody's been telling around that I used to be a whore."

Giyt froze. He hardly heard Lupe sobbing, "I told you, Matya! You shouldn't have said anything!"

And Matya, half defensive, half repentant: "I thought she ought to know what those bastards at the firehouse were saying about her. They're all Hagbarth's buddies, I hated Lupe going there."

"They're not all like that," Lupe protested.

"No, but the ones in charge are. Evesham? I'm sorry as hell about this, but really you did have to know. Hagbarth's got all these regulations that he pulls out when he wants to. He might even be able to get you kicked off Tupelo, like Shura Kenk."

"She's the one who used to live here in your house," Lupe supplied.

"I remember," Giyt said. "But I thought she just got tired of living on Tupelo and went home."

"Went home! Hagbarth had her thrown out. They said she'd molested one of the Grayhorn kids—the twelve-year-old, a born liar if I ever saw one. But they believed what he said. So they sent a special rocket up to the Pole and flew her back in the middle of her shift to face the charges."

"She didn't do it, of course," Lupe put in. "She said so, and we believed her. She said Hagbarth was just ticked off at her for something that happened at the factory."

"But the mayor deported her. Well, it wasn't just the mayor. It was Hagbarth, of course. And he could do that to you, too."

Rina looked questioningly at Giyt. "Maybe that's not such a bad thing, Shammy? Maybe we ought to go back home anyway."

"Oh, please no, Rina!" Lupe begged. "Everybody knows what a turd Hagbarth is, it'll all blow over. We don't want you to leave!"

"Do you really want a whore living next door to your children?"

"We want *you*, Rina!"

And Matya chimed in: "What does it matter what you did a long time ago? I mean, do I care? Back home, I used to work for the IRS."

The good thing about being on Hoak Hagbarth's enemies list was that it sure did cut down on the number of people who came to ask Giyt for favors. The bad part—

Well, there were more bad parts than Giyt could count. Never mind the crazy, silly problem with the Kalkaboos; never mind the possibility that Hagbarth might kick them right back to Earth. What troubled him most was what all this was doing to Rina. She had just barely got used to her status as the pregnant wife of a well-respected man when she had to get used to

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his new status as a semi-pariah and, worst of all, her own. It wasn't just the embarrassment. It was a situation that couldn't be good for the baby. For that Giyt intended never, ever to forgive Hoak Hagbarth.

Then there were the second-order derivatives of that bit of nastiness. One big question, for instance: How had Hagbarth found out about Rina's past? There was nothing about that in the open records even back on Earth. Giyt had made sure that was so long ago, as a minor and unmentioned courtesy to a friend. Had someone back home done some serious digging? And if so, were they likely to do the same sort of digging in Giyt's own records? They would certainly have a tough time, because he had erected some pretty solid blocks over everything that related to his own history. But would they withstand a really serious attack by a really high-powered investigation?

If Giyt were still back on Earth he could certainly handle that problem. He had included plenty of fire alarms and snooper-detection systems, so that he would be warned of what was happening in plenty of time to derail any imaginable inquiry. But he wasn't.

The best he could do here on Tupelo was to create a scout of his own and task it with roaming through the files back on Earth and reporting back to him. That was no particular problem, either, but the scout couldn't be transmitted until the next time the portal was open. Then he couldn't hope for a response until the time after that.

He did it anyway. When he had finished he noticed an unusual food aroma, and when he went into the kitchen he found Rina cooking up a huge batch of French fries. "Oh, they aren't for us, Shammy," she said, decanting them onto paper to drain. "Remember, we got that nice present from Mrs. Brownbenttalon? Well, we never gave her anything in return—like, you know, a thank-you present for having us over? And I remember her whole family was crazy about French fries at the fair. Do you think she'd like that?"

"I guess so. Well, sure she would," he said, less interested in the gift than in the fact that Rina seemed to have put Hagbarth and his gossip about her out of her mind.

"So when they're ready, would you like to take them over to her place for me? I'd do it myself, but I promised Lupe I'd help her take the little ones to the clinic for their checkups."

He would. He did; and so an hour later he got out of the cart at the gate of the Brownbenttalon residence with a thermally wrapped kilo of French-fried potatoes in his hand.

The whole Centaurian compound was fenced in, and the entrance gate was not exactly a gate; it was more like a cattle-crossing guard for some ranch on Earth, metal plates carrying a small electrical charge to discourage the smaller children from wandering away. They were no barrier to Evesham Giyt, but he waited politely until an immature female bustled up. "Oh, it is Large Male Giyt," she said, clearly surprised, apparently pleased. "Wait please." And a moment later Mrs. Brownbenttalon herself ap-

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peared, followed by a gaggle of subadults and children.

She raised her foreparts to give her little paws room to work, looking like a thoroughly bowed frankfurter as she rested her weight on her belly, and ripped the package open. "Ah, tubers in fat!" she exclaimed, giving every appearance of delight. She sampled a couple for herself, then indulgently handed the rest out, one fry apiece, to the children. "Is notably kind of you and same-size wife, yes. Look how they gobble! Now you come in, have small beverage, OK?" And then, when they were settled in the little garden with two males hastening to bring them the pruney drinks, she inquired sociably, "You tell how are things progress with you? Is all completely well?"

"Just fine," he said automatically, but the question hadn't been entirely sociable. Mr. Brownbenttalon raised his nose out of his wife's back fur and clucked reproachfully at him, while his wife simply gazed in silence at Giyt.

"Well," Giyt confessed, "maybe not *absolutely* fine." He hesitated. She didn't seem to know about the rumors floating around the Earth community, and he didn't want to discuss the troubles among Earth humans with a Centaurian, anyway. But Hagbarth wasn't his only problem. "It's the Kalkaboos. I don't know what to do about them."

"I conjectured this," she sighed. "You don't know what to do, no one else do either. Stinky, noisy people, Kalkaboos, always getting feelings damaged. You want me helping for this situation?"

"Helping?"

"Can do so," she said modestly. "I have personally among them some certain less unreasonable acquaintances. Could negotiate on behalf of you if you wish, perhaps arrange some arrangement to reduce tensions maybe, what do you say?"

"Well—" he began, but she raised one paw to stop him, its single twisted talon gleaming.

"It is not necessary to express copious thank-you's," she said benevolently. "You know next Commission meeting? You don't go there by yourself. You wait. At proper time I come by your dwelling, pick you up, take you to meeting so you can expiate offense given to noisy Kalkaboo High Champion. Have no further fears, Large Male Giyt. It is all to be OK."

When he got home Rina was just taking her leave of Lupe and the children. She hurried to join him, putting up her face to be kissed. "So did Mrs. Brownbenttalon like the fries?"

"Oh, sure," Giyt said absently, sniffing. "She said to thank you very much. What's that smell?"

"We've been wondering about that. Lupe said she thought maybe some Delts had been around, but it doesn't smell Delt to me. Anyway, would you like a cup of coffee?"

She started the coffee-maker, but left to take a message on her screen. She was gone long enough for the coffee to be ready, and Giyt was just pouring out two cups when she came back, broadly grinning. "Guess what, hon? I heard from my sister again. They *loved* the clock, Shammy! They

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say all the neighbors are green with envy because— Shammy? Is something the matter?"

He hadn't been able to keep from changing expression. "Nothing," he said. "I just remembered— No, nothing."

"You sure? Well, anyway," she said doubtfully, but picking up speed, "they're really impressed by what I told them about life here on Tupelo. Salen says she'd cut out of Des Moines and emigrate in a hot minute, it sounds so good, but her husband's a real stick-in-the mud—"

By then Giyt had his expression under control. He nodded and smiled, while he considered the sudden enlightenment that had just come to him.

Rina's call to her sister! That had to be how Hagbarth had tracked her record down. Once somebody who was looking for dirt on the Giyts knew that the sister existed it wouldn't take a major expert to find out everything there was to find out about Rina.

When Rina set down her coffee cup and excused herself for a moment Giyt pondered the consequences. That answered a question for him but, like many answers, it was of no practical help. There was nothing for him to do about it, least of all reproach Rina for giving Hagbarth's gang the chance to dig up old dirt. The damage was done.

"Hon?" Rina said, frowning as she came back. "I'm afraid the toilet won't flush. What do you suppose is wrong?"

Giyt was no plumber, but it didn't take long to find out the answer. When inspection of the bathroom showed nothing obvious, he looked out at the back of the house.

There was an excavation that hadn't been there before, and a rank smell of sewage. While they were out of the house somebody had dug up their drains. And it seemed that Hagbarth's harassment was not going to stop with gossip. ■

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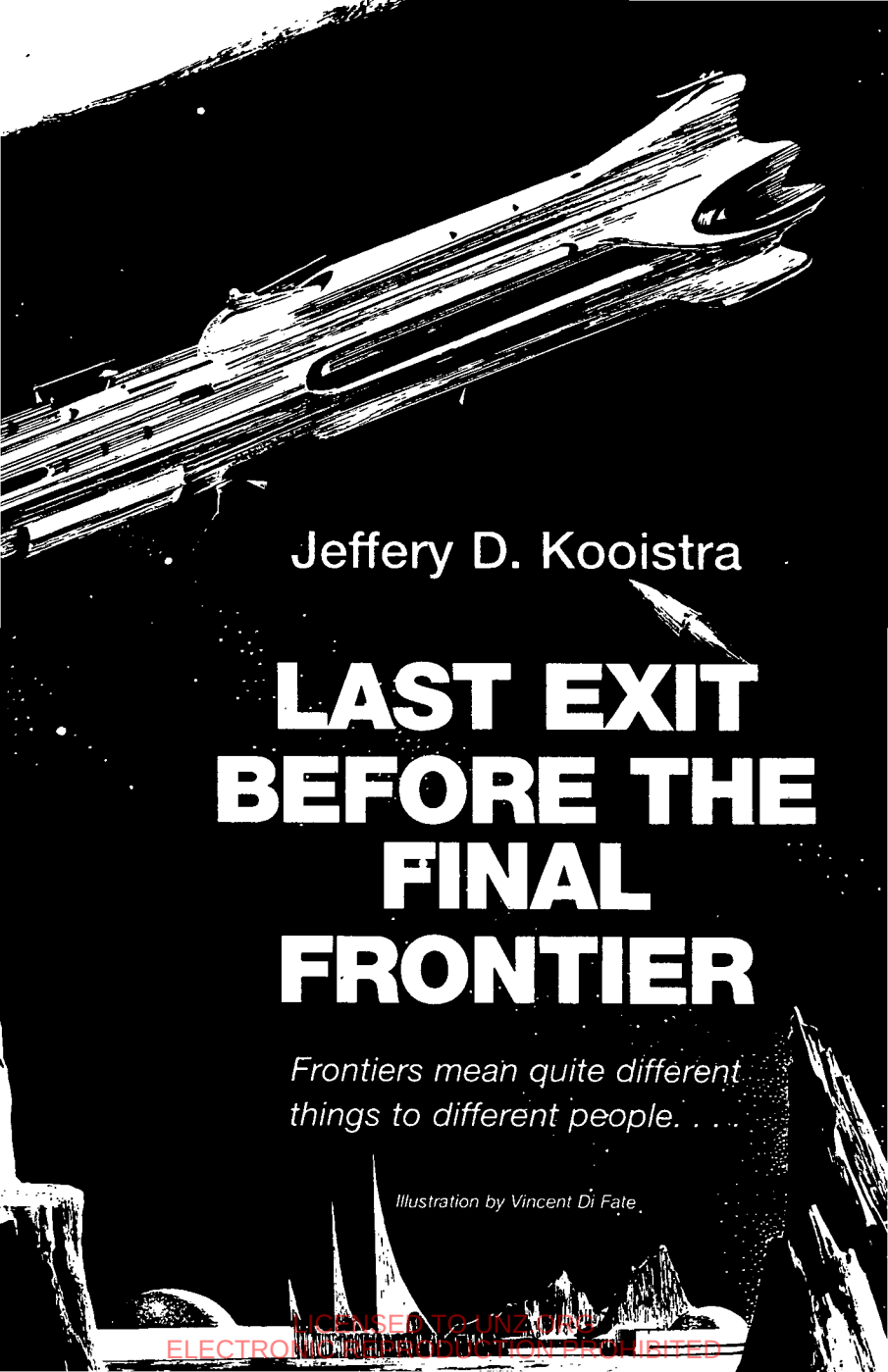

Jeffery D. Kooistra

LAST EXIT BEFORE THE FINAL FRONTIER

Frontiers mean quite different things to different people. . . .

Illustration by Vincent Di Fate

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When I'm off duty, I like to go up on Carver's Peak and watch the really big ships come in. I remember the last time I saw *Ashley's Charm*, all five kilometers of her, slowly being brought in by the tugs to the huge interstellar spaceport here on Cameron. As I watched her gain size against the background of diamond-bright stars, she slowly turned as the tugs oriented her for parking orbit insertion, and the doors of the thousands of individual spacecraft berths came visible.

I looked at my watch. Two more hours.

In two more hours, I'd be back on duty, and as a senior port loadmaster, I'd be responsible for assigning transport slots to the multitude of individual ships that had come from deep down the well of the Solar System—from Earth, from Mars, the inner asteroid belt, and the satellite systems of the gas giants—craft bearing families intent on leaving this star system to vault into the vastness of the Universe and build a life out there under the light of other suns.

One of those ships coming up from Earth—Luna actually—would be carrying my Mom and Dad and little sister. They'd be arriving on Cameron later in the day, and I'd assign their ship a berth on *Ashley's Charm*.

And the arguments would start again as they tried to get me to go with them.

Cameron happens to be the largest minor planet in the outer asteroid belt close enough to the inner edge of the Hague Limit to serve as a port for the transport starships. Her size is not only important to provide enough room for adequate facilities to service the now dozens of ships that arrive and depart from her each week, but also to provide the psychological sense that she is, in fact, a world, with myriad diversions for the travelers to partake of just before beginning the long trek through interstellar space. She has two sister worlds, also ports, spaced around the System. But Cameron is the best and biggest.

One of the consequences of the invention of the hyperdrive was the growing kinship of the people of the interstellar age with those of the days of sailing ships. Maximum speed in hyperspace is two light-years per month, so it takes more than two months to get to the nearest star, and most of the interesting worlds are at least a six month's journey away.

Hyperphysics is an interesting thing. One suitable hyperwarp engine can lift even a ship the size of *Ashley's Charm* into hyperspace with a rather small amount of energy, but only outside the Hague Limit, which for the Sun is 57.4 astronomical units out. Inside the Hague Limit, two hyperwarp engines can be employed in resonance to provide a marvelous sublight drive, and personal spaceships for trips around the Solar System become more and more common each day.

For economic reasons, people like to take their spaceships with them when they get the itch to head out for the stars. For economic reasons dictated by hyperphysics, it's a lot cheaper to build huge interstellar transport ships to travel from Hague Limit to

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Hague Limit than from star to star.

Though on duty when my parents' ship came in, I was able to take a late lunch and meet them at their spaceport berth. I knew Mom and Dad had gotten a new ship last year, but this was my first chance to see it. Their previous ship had been twenty years old when they bought it, but it had served to take my sister and me all over the Solar System. It wasn't until I'd gotten out on my own and moved to Cameron that I actually spent two consecutive years of my life without visiting another world.

I had to admit that the folks had picked a nice ship. Big one, too, compared to most of the jobs I was used to slotting onto the transports. A Capitol Products System Sailor, the ship was forty meters long and ten across at the widest, which would leave it with habitable space about the same as a three-bedroom apartment. *Miss Michiko* was emblazoned across the bow. She was perfect for jaunts around the planets, but a bit close for trips with travel times between stops reaching into months. Hence, the big transports for the long journeys.

The ship came in smoothly, settled, and I saw Dad wave to me from the pilot bubble. It was only a few minutes more until the hatch slid up and Mom barreled out and launched herself at me. "Joey! Joey!" she said, trying to smother me in a hug. "I'm so glad to see you!" She pulled back. "What's that on your face? You're not growing a beard, are you?" She hugged me again. "Your father and I have missed you so much."

"Well, me *too*," I heard, and saw my little sister Penny coming down the ramp wearing a stylish blue jumpsuit. I hadn't seen her in person in almost five years. She was fifteen when I left. Her hair was still long; she was a little taller but had much more of an hourglass figure than the last time I'd seen her. Baby sister was a woman now.

It was Penny's turn for a hug and we held each other like—well, like we'd never held each other. (I think I gave her a punch on the shoulder when I'd moved out.) She gave me a kiss on the cheek then whispered, "I *need* to talk to you alone." I only had time to nod that I understood before Dad came out.

Dad looked great. Why shouldn't he? He was about to do what he'd always wanted—head out for the stars and begin to see the Universe. The Solar System just wasn't big enough for him. Penny and I had learned that very, very early in life. Big and rangy, with the bushy beard I'd never seen him without, the man weighed in at a hundred kilos and hadn't gained nor lost one during my lifetime. He had his hand thrust out, but when I reached for it he slapped my hand away and threw his arms around me. "None of that, boy. God, it's good to see you. So, you want to come along?"

I was ready for that. "Can't. My plants will die," I said. "Besides, I'd have to give two-weeks notice and you'll be gone by then."

"Ho ho, always with the jokes," Dad said. "But we'll be here a couple of days, Son. I *am* going to try to talk you into coming. Besides, don't you want to be with your sister again? You

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haven't seen *her* in years. She's growing up without you."

Though Mom and Dad had been out to Cameron a few times since I'd left home, Penny had always been at school or, later, on an archeological dig (her passion). But I didn't miss that Dad had said "growing up." *Grown up, Dad,* I thought. *Grown.*

"Are you going to take us around, Joey?" Mom asked.

"Afraid not, Mom," I said. "I have to go back to work. I took a late lunch as it is just to come see you in."

"That's a shame," Dad said. "When will you be finished?"

"About three hours from now. Tack on another hour for me to get presentable and I'll come find you all back here then. In the meantime, I'll walk with you down to Information and you can take your pick of what you'd like to see, or maybe get something to eat. This place is quite the cosmic Las Vegas."

"I remember," Dad said.

"Well, *I* don't," Penny said, and as we emerged from the corridor to the central information square, she ran ahead to one of the casino alcoves.

I left Mom and Dad there and returned to work. *Shannon's Virtue*, sister ship to *Ashley's Charm*, was being loaded today.

The big ships are rather easy to load. They're so large that the mass of any individual ship along for the ride is practically negligible, at least from a safety standpoint. But the proper arrangement of several thousand ships into an efficient mass distribution can still, over the course of a voyage, save the company a couple million credits in operating costs. More than enough to pay loadmasters like me and still have, well, a couple of million credits left over. (My salary was practically negligible, too.)

The rest of my shift went quickly. I rather liked my job. I'd started on Cameron as a pilot, flying other people's ships into their assigned berths on the liners. But I'm a climber, and first chance I took the test and made it to assistant loadmaster. As a senior loadmaster, I was only one rung on the ladder away from having my own office.

I don't know if Mom and Dad ever understood me. For them, every horizon crossed just egged them on to go and cross the next one. Sure, Dad's trading company had made us a wealthy family, and helped to quench some of his thirst for traveling, but once he'd retired as president, he and Mom were going to be on the go for the rest of their lives.

I like the sea of space just as much as they did, but I'm perfectly content to stop on an island just offshore within sight of the mainland, and make a life for myself there.

No way was I going to go with my parents.

Just like on the big starship transports, visitors to Cameron have the option of either staying at a room at the spaceport or staying in their ships and using them as apartments. In fact, almost everyone willing to make a star journey buys a ship big enough to serve as home along the way. Although a family-sized spaceship isn't large enough to spend half-a-year in if you can't go outside, on board the big

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liners they're just right to serve as home when you have a portable world five kilometers long to walk around in.

When I got to the berth, Dad showed me around his new ship. "See? Master bedroom right here for your mother and me. This other room is for Penny, and we have all of her course work loaded in her workstation so she can continue her studies."

"Did you include a sandbox so she can work on her digging skills?" I asked.

"What? Oh, hah hah. Always with the jokes, you," he replied then took me up to the control bubble and then insisted on showing me the drive room. Even though I'd seen thousands of drive rooms and control panels, I muttered the usual comments about how nice and special the ship was. Hell, it *was* a fine ship, no doubt about it, but hardly novel to someone like me.

We went to eat at the Last Exit Saloon, and it was fun to have dinner with the whole family again.

"Is there anyone special in your life, Joey?" Mom asked during dessert.

I'd disappointed her twice before when she and Dad had visited, but this time I had more hopeful news. "I think so. Her name is Angela. I would have invited her to eat with us, but she's at our sister station a hundred twenty degrees around the outer Belt."

"How serious is this?" Dad wanted to know.

"Neither of us is seeing anyone else. I'd like to keep it that way," I said.

"I guess I won't bring up you coming with us again," Dad said. "I don't think I can overcome your attitude *and* a woman's charms. Congratulations, Son. I hope you make that life for yourself here that you say you want." He hoisted his wine glass. "To Joey and his future here."

We drank up and I couldn't believe how good I felt. Fighting with my folks about my future had been going on since I was fifteen. To have Dad finally call a truce and accept my terms was a welcome but unexpected victory.

Penny drank the toast with us and smiled, but somehow it seemed to me it was a sad smile. After dessert she said, "Take me dancing, big brother?"

"Dancing?" Dad exclaimed. "Not me. I'm beat. You kids go along. Your mom and me will go back to the ship." Dad never noticed that Penny hadn't *asked* him to come along, but there wasn't any reason to point it out.

Our folks went their way and Penny and I went ours. "You don't really want to go dancing, do you? You just want to talk?"

"Yeah."

"We'll go to my apartment."

We went through my door and Penny flopped down on my bed. She used to do that when we were kids. "I can't go with Mom and Dad. I don't *want* to go with Mom and Dad. My life has to be on Earth. I can't live it anywhere else!"

"Bad as all that?"

"Yes."

"Why?"

"Because I'm an archeologist, dammit! What am I going to dig up on some other planet? We haven't found another world yet with a civilization on

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it. The Phinons saw to that. And so what? I want to figure out what *our* ancestors were up to, not some other species." She rolled over onto her stomach. "But it's no use. Dad isn't going to let me stay. I'm too young to just up and leave, and I sure can't afford school without Mom and Dad's money."

"But Penny, even if you can't get them to agree now, in less than a year you'll be twenty-one. And you're already way ahead of your peers." Penny had finished high school at fifteen, her undergraduate work by nineteen. She was in her second year as a graduate student while most of her friends hadn't even gotten through college. From my advanced position of five years her senior, I smiled at the impatience of youth. "You could go with Mom and Dad, finish your course work with them, then come on back after you're old enough. They know they can't stop you forever. You have to remember that you're the baby of the family. I bet a lot of Dad's objections have to do with that more than with any rational arguments. I mean, what exactly *did* he say when you told him you wanted to stay?"

From Penny came a most unexpected and disconcerting pause.

"Oh, shit. You didn't tell him anything, did you? He said you're all going and you sulked silently while you packed your bags and didn't say a peep to him about staying."

"No, I didn't! Oh, poop! I'm a wimp. I admit it. It's learned helplessness. I knew that if I said anything he'd just talk me out it. You know how convincing Dad can be. I'm not like you, Joey. Mom and Dad were always proud of you. Even after you said you were leaving, and did, they admired you for it. Dad would make jokes about you fleeing the nest rather than leaving it, but he never sounded like he was bitter or hurt. I think he did the same thing to Grampa himself."

"You think they aren't proud of you? C'mon, Penny. One of the reasons I left was because I couldn't compete with my baby sister. When we were in high school together my teachers used to ask me why I couldn't be more like my *little* sister. I knew you were going to make a huge mark in the world. I don't begrudge you that. But the last thing I wanted was to be close enough for comparisons to be made. I would have been just a junior executive in Dad's company while you were making headlines around the world."

"I find it hard to believe that you left home so you wouldn't have to suffer in comparison with me," Penny said, sounding for all the world just like Dad. Higher voice, but the same choice of words.

"OK, no, it wasn't just for that. But that *was* a part of it. I wanted to go and do my own thing and it didn't have anything to do with Dad's business. I also didn't want him and Mom constantly trying to sell me on the romance of going to the stars and all that. They're dreamers—I'm not. But you still haven't answered my question."

"What question?"

"Why does it have to be now? Why *can't* you go with them for a year? Our folks aren't getting any younger, you know. And you *are* their baby. Would it be such a big deal to humor them for

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one year of your life? Like I said, you're way ahead of all your friends in school. Even if you took three years off, you'd still have your doctorate before any of them are done."

"I can't go now because there is this really big find that I want to be a part of," Penny said.

I waited but she didn't supply any more details.

"Well? What kind of big find?" I prompted.

"I can't tell you that."

"Why the hell not?"

"It's not just you, Joey," Penny said. "I can't tell anybody. This is big. This is the biggest thing in archeology ever and the whole crew of us are sworn to absolute secrecy. It involves the Phinons and if Professor Towner found out I told anybody he'd skin me alive. If this isn't handled right, instead of making our careers, we might just get ourselves ostracized from archeology!"

"How do you get ostracized from—"

"It happens, Joey. It happens. You don't find what you're *supposed* to find and the journals won't publish you and the other archeologists gang up on you. Dr. Towner says he's so far out on a limb right now as it is that it might break all by itself even if we do everything right."

I couldn't get any more out of her about the find. Everyone has heard about the Phinons. We defeated them in a war a century back, and the hyperdrive came out of that war. But the Phinons never came inside Hague Limits unless it was to wipe out civilizations just getting close to star travel. They dwelt among the cometary haloes and they'd been doing it for about a billion years. I didn't know what in the world one could dig up on Earth that would have anything to do with Phinons, and press as I might, Penny wouldn't tell me.

"OK, OK," I said, giving up the interrogation. "But the bottom line is that we have to try to convince Dad to let you stay but we can't tell him why it is you have to stay now. He's going to want to know why you can't just take a year off same as I wondered."

How to convince Dad? I didn't have a clue as I went to work the next morning, though Dad was going to be coming up to the station to see just what it was I did now (I'd had different, better, jobs each time my folks had visited). Still, it made me feel good to "play" the big brother for Penny as well as just being one.

The control station is a big sphere atop the main tower. Though it can be made transparent, when we're working the interior of the sphere is all projection, and though we stay safely on the surface of Cameron, it looks like we're flying through space.

My way to travel!

I was figuring out assignments for the loading of *Ashley's Charm* when it occurred to me that maybe the best thing to do was just to show Dad how successful I was becoming on my own, and then start hinting around about how Penny deserved the same chance. I had doubts about it working, though. Promising to help and being able to are very different things.

I had *Ashley's Charm* about a third loaded before Dad showed up. The

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first third is always the easiest—we load up the tail end with all the smaller ships which pretty much all mass the same and so there's very little jiggering around to do.

Dad walked into the globe and gave that most satisfying double-take that people do when they come out of the dark elevator and find themselves apparently floating kilometers out in space. He stared around, taking everything in, and I knew I'd just gone up in his estimation simply by virtue of where I work.

"Boy, Joey, I can see why you like your job so much. I could get used to this pretty fast myself," he said.

"It is magnificent," I admitted. "Look over there, Dad. Our pilots are just starting to berth some of the bigger ships on *Ashley's Charm*." A pretty cruiser almost as big as Dad's was positioning itself for insertion into the landing bay, looking like a gnat preparing to land on an elephant.

"Wow! Is the owner piloting that boat, or is one of your guys doing it?"

"One of our guys, always," I said.

"But I was hoping to dock *Miss Michiko* myself."

"Sorry, Pop. Our insurance won't cover it. It's not only your ship we have to worry about, it's the liner, too. If we let a thousand different owners do their own docking, how long do you think it would be before one of them blew it? I trained for months before I got to berth my first tiny launch. And I don't even want to think about the possibility of some terrorist deliberately flying his boat into the liner."

"Why would anyone want to do that?"

"Not everyone loves the stars like you do, Dad. There are plenty of people who don't think we should be going at all. They think the Phinons and the Hague Limit are God's quarantine."

"Nuts," Dad said. I wasn't sure if he meant the people I was characterizing or if he was just disappointed at not getting to berth his own boat.

"I'm glad you realized that I'm not like you and Mom, Dad. I was afraid when you told me you were going to stop here it was to try to get me to go along." Even as I said it, I felt I was being entirely transparent. I wanted to segue into Penny's situation, but I was half afraid Dad was suddenly going to say, "Penny's going and that's it."

But he didn't. "That's OK, Son. Mom and I knew you were different very early on. You never wanted to go on trips, even when you were a little kid. You completely ignored my science fiction books. That's one of the reasons we had Penny. We wanted to see if we'd have better luck the second time around." Then he turned to look at me, both smiling and serious. "You do realize I'm joking, don't you? Your mother and I are proud of you."

"I know. But how was Penny so much different from me?"

"Oh, we knew immediately that she was like us. Penny always wanted to go along. You couldn't take a walk with her without her wanting to round just one more curve or look over just one more hill. She always needed to see what was on the other side of the horizon. Problem with her was that Mom and Dad always had to come along. If she'd gotten a little

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more of your independence and you a little more of her romantic streak. . . ." he trailed off.

"What?"

"Then I'd have somebody else's children. Anyway, your Mom and I couldn't love either of you any more than we do."

"Me and Penny know that. But what I was trying to say is that Penny is studying to be an archeologist. Does she really want to interrupt her studies to see the stars?"

"She's young, Joey. She has lots of time to finish up. She's years ahead of her friends. Besides, she hasn't said a word to us about not going along. I mentioned she could probably continue her class work on the ship and she went right out looking for study files to take along.

"No, Joey, you're reading your own feelings into your sister. She's not a little girl anymore. I find it hard to believe that if she didn't want to go, she wouldn't have said something."

At that point I knew there was nothing else *I* could say to Dad to convince him that Penny wanted to remain behind. Penny was either going to have to tell him herself before tomorrow morning or she was going to the stars.

Later that day *Miss Michiko* was flown up to her berth. Dad didn't get to pilot, but he insisted on being aboard when she went up. I had a chance to tell Penny that I'd gotten nowhere with Dad during his visit to the control center before she and Mom went shopping one last time, passing the time while waiting for Dad to return on the shuttle from *Ashley's Charm*. I was too busy to give the issue much more thought, anyway. I knew I'd be supportive of Penny tonight at our parting dinner, but my saying anything would depend upon whether or not she found it in herself to tell Dad she wanted to stay.

She hadn't been too good at that yet.

I had just come off shift and was heading back to my apartment to clean up before dinner when I ran into Mom and Penny.

"Is Dad's shuttle in yet?" Mom asked.

"It was just getting ready to leave *Ashley's Charm* when I left the control center," I told her. "Dad should be down in about ten minutes." Penny was carrying a bag. Mom hadn't bought anything. "What'd you get, Penny?"

She took it out of the bag. It was a toy—an action figure, of a slim, monstrous thing with arms and legs that bent the wrong way. She held it out to me.

"Why did you buy a toy Phinon?" I asked, taking it from her.

"I asked her that, too," Mom said. "That toy costs three times as much out here as it does insystem."

"I bought it for inspiration," Penny said, taking it back and slipping it into her bag. "Either that, or as a reminder."

"Reminder of what?" Mom asked.

Penny just smiled.

Mom and Penny went to meet Dad at the shuttle dock, and I went to clean up, promising to meet them at dinner in half an hour. I showered,

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looked in the mirror, then shaved off the beard I'd started to surprise Angela. That was for Mom. Even though she'd married a bearded man, maybe because she had, she liked me looking well-scrubbed and clean-shaven, and she wasn't going to see me again for at least a couple of years.

On the way to dinner it began to sink in that this time it was my folks who were leaving me behind. I had only fled the nest for another branch on the same tree, but they were heading to an entirely different forest.

The family was already seated when I arrived, and just about to have their orders taken. I slid into the seat to Dad's right. He finished talking to the waiter then said, "Hello, Joey. You were right about the piloting. That berth is kind of narrow. I'm glad I didn't have to try to fly into it myself."

Dad was buying. I ordered first and I went for the steak and lobster. We grow our own lobsters on Cameron so they don't cost *that* much more than on Earth, but even if they did, Dad could afford it, and he had never been cheap.

In fact, Dad also ordered the steak and lobster, Mom got the chicken, and Penny ordered the vegetarian salad. "Is that all you're having?" Dad asked.

"It looks like a pretty big salad," she replied. Penny isn't a vegetarian, but you can pick at a salad for a long time without actually eating much of it. She was nervous about the showdown with Dad, I was sure. Nervousness always killed her appetite. At exam time she used to live on water and air.

It was a fun meal during the main course. We recalled fond memories of trips we'd taken as a family. "Remember when we flew through the rings of Saturn?" "How about the hiking we did on Miranda?" "My favorite was the skiing trip to Titan."

Dad talked about their coming trip to the stars. "First stop, Tau Ceti, and the sunny seas of Tropic," he said. "If I like it there enough we may not even leave."

"What? And not see what's at the next star? Hah!" I said.

"You have your old man pegged," Dad laughed. "The Universe is the limit. And after we finish with this Galaxy, there's a bundle of others to see." He raised his glass. "To the final frontier," he toasted, and we all, even Penny, clinked glasses.

We were well into dessert and I was wondering if Penny would say anything at all when it finally happened. We were just making small talk and Dad said, "I hope you don't miss the three of us too bad while we're gone," when Penny put down her spoon and said: "Dad, I can't go."

No preamble. No indication it was coming. No distant sound of thunder to warn of coming storms. Just a bolt from the blue.

"Dad, I can't go."

Dad's last spoonful of ice cream didn't make it to his mouth, just stopped halfway there and then returned to the plate. I don't know what I expected him to say. I knew he wouldn't just blow up. If it was anything like my breaking-away time, the blow-up wouldn't happen until after the calm discussion had escalated into

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an argument and Dad realized he was losing.

But it was Mom who went first. "What's the matter, honey? What's wrong?"

"I just can't go."

"Don't you think you could have brought this up a little sooner?" Dad finally asked.

"Daddy, I'm sorry. I really am. I should have said something before. I should have told you before we left. But . . . I just can't go."

"Well, why not?"

Penny was ready for that. "My work on Earth is at a critical point. And more than that, Dr. Towner is sitting on the biggest find of the last hundred years. I want . . . no, I *need* to be a part of this. It will make my career. It will make everyone's career. It will rewrite our entire understanding of human history," she said, and as her thoughts turned to her work, her confidence soared.

"Oh, really? Big as all that, huh?" Dad said, and I could hear the sarcasm coming. "So immensely huge that you waited until we were an hour away from going to the stars before bringing it up. Why was that, Penny?"

The confidence went away. She looked into her plate. Very softly: "Because I was afraid."

"Afraid of what?"

"Afraid of you."

"Why?"

"Now, Father—," Mom started to interrupt.

"No, let her answer," Dad said, cutting Mom off. "If Penny wants to stay behind and fend for herself, she'd damn well better start speaking for herself.

"Now, Penny, why are you afraid of me?"

I, of course, was lending my moral support by eating my dessert quietly.

"I said that wrong," Penny continued. "I'm not afraid of you, Dad. I was afraid of disappointing you. I know you've . . . you and Mom, I mean . . . have always counted on me being the one that's like both of you. You know, always looking over the next horizon. I knew the minute you brought up the star trip that you'd just assume I'd love to go as much as you and Mom. I knew all you were thinking about was whether or not you could convince Joey to go."

"Good thing that's all settled," I interjected, not wanting it to come up again as an issue.

"No. I knew I'd ask Joey, maybe even try to pressure him a bit. But I never expected I'd succeed. I know my children better than that. At least I thought I did. You're right—I assumed you wanted to go. You've always 'wanted to go.' So now I'm mystified—why don't you want to go over this next horizon with your Mom and me?"

Right around then I noticed that the spoon I'd been lifting to my mouth kept coming up empty, so I set it down and started playing with my napkin instead.

"Because there's another horizon I want to cross," Penny answered.

"What? There's some *boy* back on Earth? One of your archeology buddies?" I knew what "horizon" Dad was thinking about.

"No-oooo . . . *time!* The horizon of *time,* Daddy. Geez, boys are a plentiful commodity. I'm surprised you

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even said that!" Penny's disgust was evident (though likely feigned).

"OK, great, fine. So it really is this big dig you're on. You should have brought this up before. So just what is it that you've found that's so important that it can't wait a year for you to come back to it? If it's so great, the dig will be going on for years."

"But I want to be there for the announcement, Dad. I want my face next to Towner's on the news."

"But what *is* the find?" Dad persisted as I knew he would. "If I don't know all the facts, then I can't make a decision. You're still a minor and we're still your parents . . ." (That was Dad, including Mom as a rhetorical equal in his decision. But they'd been married for thirty years by then, so who was I to say anything?) ". . . so if you're going to stay behind, I, *we*, have to have a good reason why."

Penny was silent for a long time. Everyone was silent. I certainly wasn't going to say anything.

Penny drew a deep breath. "I can't tell you," she said. "I promised Dr. Towner . . . I promised everyone, we all promised . . . that I wouldn't tell anyone about the find. The significance will be obvious once we go public, but before then . . . No, I can't tell you, Daddy.

"If you can't let me stay without knowing . . ." and she let out a big sigh, ". . . then I'll just have to go."

Penny stayed.

Sure, she'd played the martyr. Sure, Penny had put on for effect. But she was being honest, of that we'd had no doubt, and somehow in our years apart she had cultivated a nobility that I knew I'd never match.

That last meal had been an all-around family epiphany.

I'd love to be able to say Dad cheerfully relented when Penny so self-sacrificially stood her ground, but the fact is he grumbled and groaned and complained the whole time while he went to send a message to Rodney (the man now in charge of Dad's company) about setting up a fund for Penny to draw upon. "We could have put a big entertainment center in your room if you'd just spoken up," he told Penny. "Damn workstation in there cost a fortune," he muttered.

But it was that he let her stay that counted, and Penny stood beside me on Carver's Peak as we watched *Ashley's Charm* depart.

You all know what happened.

Five months later the news broke. The archeologist Towner and his crew of graduate students had found, underneath a seventy-thousand-year-old layer of lava, the remains of an alien base. Absolute evidence that somewhere in the Universe another species had survived the Phinons and achieved star travel.

Penny's face was right next to Towner's on all the news shows.

A month after that word came from Tau Ceti that *Ashley's Charm* had failed to arrive, though three months later still a debris cloud from the right direction showered the star system.

No one ever figured out what happened. Malfunction? Phinons? The debris yielded up no secrets.

It's hard for me to believe Dad is dead.

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I mentioned earlier that I sometimes wonder if my parents ever understood me. Now I wonder if I ever understood them.

In reading back through this I notice how Mom seems to play such a minor role. It wasn't really like that through our lives together, but at that time and in that place, it was the ultimate relationship of a father with his children that had to be sorted out. During those last days together, Dad behaved in a way that, I now see, was typically Dad, though at the time Penny and I had misread him entirely.

Penny is "Doctor Penny" now, and she runs her own digs. Another alien site was discovered near Olympus Mons on Mars last year. She was terribly excited.

Penny and I inherited the family fortune, but I still work and I'm chief loadmaster with my own office now. Though all the passengers on *Ashley's Charm* were declared dead, I sometimes wonder if that's true.

Ships like *Miss Michiko* were quite something. Though the drives were not balanced for hyperflight, they had sufficient power to propel the ships to near-light velocity. Could the passengers have known what was coming? Could they have fled *Ashley's Charm* before the calamity?

Could Mom and Dad be on their way back home?

Small ships do not carry hyperwaves, nor radios capable of transmitting billions of kilometers, so no word would have come from *Miss Michiko*. But it would have made far more sense for Dad to have gone on to Tau Ceti if he and Mom had somehow survived.

Still, I like to go up on Carver's Peak and watch the big ships come in.

But now I look for little ones, too. ■

Editor's Note: This story takes place a good while after "Sunshine, Genius, and Rust" (May 1993), and "Young Again" (December 1993).

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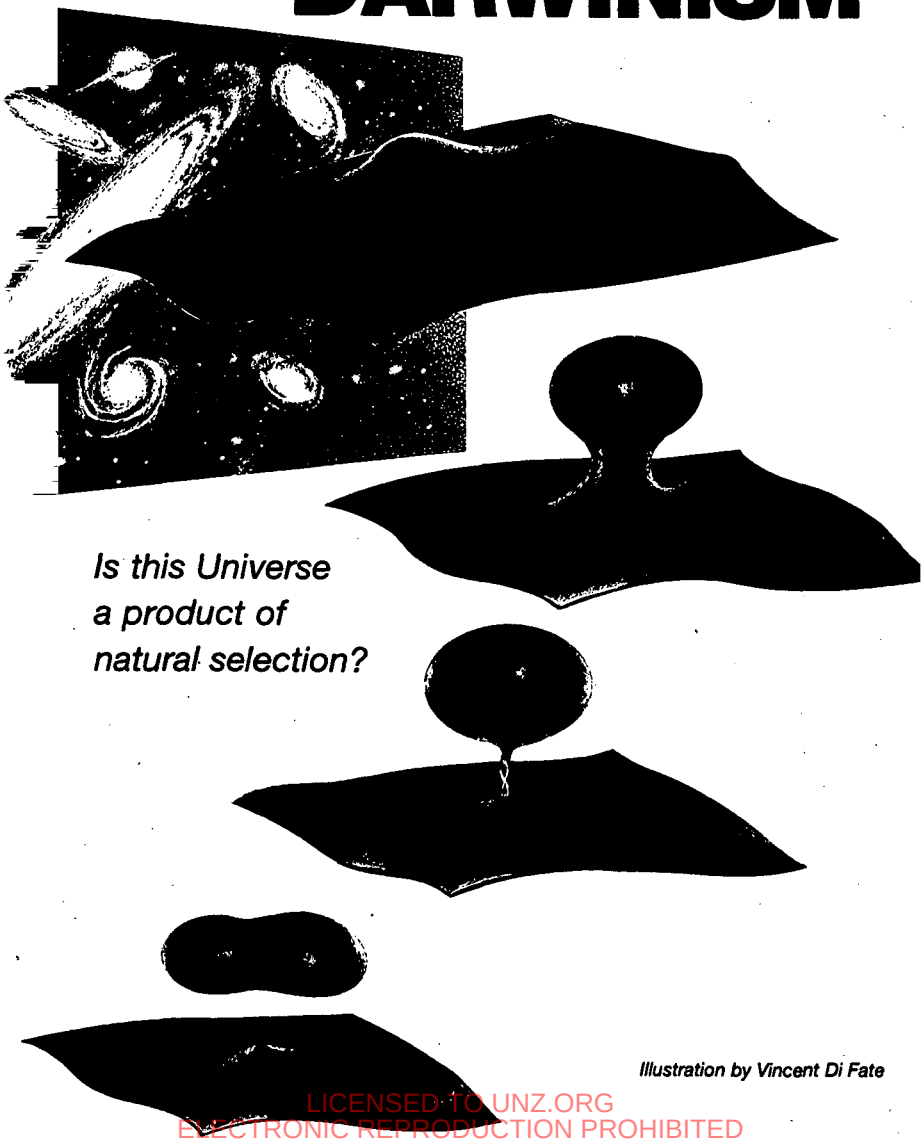
Richard Meisner

COSMOLOGICAL DARWINISM



Is this Universe a product of natural selection?

Illustration by Vincent Di Fate

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About ten years ago I wrote in this space ("Universe—The Ultimate Artifact?," *Analog*, April 1987) on a topic that was then fairly new—namely, the remarkable degree of apparent fine-tuning in the values of the fundamental physical constants. Change the relative strengths of gravity and electromagnetism by just a few percent, for example, and there could be no long-lived stars, nothing heavier than helium in the universe, no complexity, no life.

Cosmology has advanced in leaps and bounds in the intervening years, and the time seems right for a review.

Cosmic Fine-Tuning: An Update

During the past ten years, the inflationary model of the cosmos (the theory that our universe underwent a very early, very brief period of extreme inflation and smoothing) has been subjected to, and passed, its first strict test. The ripples in the background radiation found by COBE have exactly matched the pattern of ripples predicted by the current inflationary model of the cosmos, vindicating not just the inflationary model but the grand unified theories on which inflation was based.

And yet, although cosmologists now have excellent scientific reasons for believing that they accurately understand the development of the very early universe, the current model is still unable to address the puzzle of why the fundamental constants have their particular values, and why those values are so finely tuned in favor of allowing the development of complex structure in the universe. In fact, the inflationary model contributes additional fine-tuning puzzles of its own. There is no obvious reason why inflation should have gone on for exactly long enough, at exactly the right rate, to allow stars and galaxies to form. A slightly shorter, less intense burst of inflation would have resulted in a quick collapse back to a singularity; a slightly longer, stronger burst of inflation would have spread things so thin that no stars or galaxies could ever form. In fact, "slightly" is too tame an adjective in this context. The line between instant recollapse and rapid runaway is infinitesimal, requiring fine-tuning to within one part in 10^{15} when the Universe was one second old, and one part in 10^{60} at the moment of creation. This fine-tuning problem is regarded by many as the biggest remaining difficulty with the inflationary model.

So the general problem of cosmic fine-tuning looms larger than ever, and the topic has become very well-known. Scarcely has a popular cosmology book been published in recent years that has not discussed cosmic fine-tuning at least briefly, providing its own take on the puzzle and, sometimes, on the possible explanations for how the existence of this unnaturally interesting universe is to be explained.

Not that many options have been identified. Scientists and philosophers who have discussed the matter have generally agreed that there appear to be only two possible explanations from which to choose: Either a vast array of randomly different universes exist, of which ours just happens to be

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one of the infinitesimally rare ones capable of supporting any interesting degree of complexity; or this Universe is an artifact of a necessarily existing, extrauniversal designing intelligence (often referred to as "God.")

Cosmological Darwinism

Many have been persuaded to join the lead of Paul Davies and other well-known physicists in opting for Design, leading to what one commentator has recently referred to as a renaissance of theism among practitioners of the hard sciences. But lately, an original and interesting elaboration of the many-worlds idea has been generating considerable interest. In a 1992 paper, Lee Smolin, a cosmologist at Syracuse University, described a proposal attempting to account for the apparent cosmic fine-tuning through a process of evolutionary selection operating, not in the biological realm, but across entire universes. He suggests that the intricate design of the structure of this Universe may have an explanation analogous to that of the intricate design of the elephant's trunk, for example. In a close analogy with biological evolutionary theory, Smolin suggests that the apparent design of this Universe may not be a result of either improbable coincidence or divine creation. Rather, in cosmology as well as in biology, apparent design might theoretically be explained as the natural outcome of the powerful combined forces of random mutation, by which the parameters that determine a system change randomly, but slowly, over many, largely similar systems, and a selective component by which those systems with a particular property are, after some time, more likely to occur.

The general idea of evolving universes is not new. Over two hundred years ago the philosopher David Hume wrote: "Many worlds might have been botched and bungled, throughout an eternity, ere this system was struck out: Much labor lost: Many fruitless trials made: And a slow, but continued improvement carried on during infinite ages of world-making."

Hume attributes the "continued improvement" to the actions of what he obliquely calls a "stupid mechanic." Smolin fills in the scientific details, replacing Hume's stupid mechanic with successive generations of slightly mutated "baby universes."

If you imagine a universe as a balloon of spacetime, you can imagine a baby universe as a small protuberance developing out of that balloon, eventually disconnecting and becoming an independently existing balloon. Recent investigations of quantum cosmology suggest that such baby universes can arise spontaneously as a result of fluctuations at the quantum level, and that one may envisage a "mother universe" giving rise to progeny in this way.

The formation of a black hole might provide the type of situation that could lead to the birth of new universes. According to classical (pre-quantum) gravitational theory, a black hole conceals a singularity, which can be regarded as a point at which spacetime comes to a distinct end. In the quantum version, the singularity takes on the fuzziness characteristic of all

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things quantum. It could be that the sharp boundary of spacetime represented by the classical concept of the singularity is replaced by a sort of tunnel (or, more suggestively, an umbilical cord) connecting our universe to a new, baby universe. As Stephen Hawking has proved, quantum effects would cause the black hole to evaporate eventually, severing the umbilical cord, and giving birth to an independent balloon of spacetime—a baby universe.

Smolin's original contribution to this speculation is the idea that the extreme conditions of near-singularity might have the effect of causing small random variations in the fundamental constants of physics. This is not necessarily a far-fetched proposal. As he points out, the possibility that the parameters of the Universe are determined dynamically has been popping up in recent work on string theory, grand unified theories, and wormhole physics. Work in these areas makes it seem at least plausible that when spacetime curvatures become of the order of the Planck scale in the process of complete gravitational collapse, the fundamental constants could be subject to small changes.

A little thought will show that this process of spawning slightly mutated baby universes would provide all that is necessary for an intriguing type of Darwinism on a transuniversal scale. The expected fate of an original baby universe would be to expand out to only about the Planck length (10^{-35} meter) before collapsing. In other words, the "natural" size for a universe is down in the subatomic region where quantum effects rule, on a scale that's about 10^{60} times smaller than the present size of our universe. But if the slight mutations in the fundamental constants of physics happen to allow a bit more inflation, a Planck-scale baby universe will grow a little larger. After many generations, if it becomes big enough, it might develop into multiple different regions that each collapse to make a new singularity, thereby leading to multiple offspring. Those new universes will be slightly different from their parents. Some may revert and fade back to the infinitesimal scales near the Planck length. But others may have a little more inflation than their parents, growing even larger, producing, if the set of fundamental constants allow it, many black holes and giving birth to many baby universes. As the volume and survival time of the new universes increase, so do the number of black holes, and hence the number of new baby universes.

Of course, very many universes would be randomly produced that do not have sets of fundamental constants supportive of the existence of medium to large stars (and hence black holes). These uninteresting and relatively sterile universes (corresponding to Hume's "botched and bungled" spécimens) might reproduce only once, at their final gravitational collapse. But universes characterized by fundamental constants leading to the existence of numerous stars could be expected to eventually come into existence, and once having appeared, would reproduce numerous times—namely, every time one of their stars collapses to a black hole.

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Star-filled universes would be fecund universes, gradually generating a large number of similar offspring.

Black Holes and Life: The Connection

It's easy to see what would happen as the process unfolds. New generations of universes would inevitably zero in on the particular, very small range (or ranges) of fundamental physical constants that happen to favor the production of stars (and hence black holes). A continually increasing proportion of newly born universes would be characterized by enormously inflated sizes, lifetimes, and numbers of stars.

And, most importantly, it turns out that stars are extremely convenient if you want any kind of biological complexity in your universe. In their interiors they synthesize the atomic nuclei heavier than helium that are essential for building any kind of life. And fortunately, when they eventually go supernova, they cast these nuclei into interstellar space, making them generally available for the formation of complex future planets capable of supporting life. Finally, stars provide very long-lived sources of thermal disequilibrium, essential for supporting the long, slow development of life. It's easy to see that universes that are vast, old, and filled with long-lived, eventually exploding stars are also, as a significant fringe benefit, amenable to life.

Now, we find ourselves, somehow, in an unnaturally large and long-lived universe, having values for the fundamental constants that are, unnaturally, just right for the existence of life. Another way of putting this, Smolin believes, is to say that we find ourselves, somehow, in a universe having values just right for the existence of many, many stars.

And, taking a look around, it certainly seems that stars are this universe's main concern—it contains billions of trillions of them. In Smolin's view, the existence of this remarkably finely tuned, star-filled (and hence life-compatible) universe turns out to have a perfectly natural evolutionary explanation. Universes with more stars reproduce more often, so after a long period of intercosmic evolution, we would expect nearly all universes to be pretty much like our own.

Universes Out of Nothing?

The skeptical reader might wonder at this point where the material is coming from for all those new universes. How can you get a universe containing over a sextillion stars out of the gravitational collapse of just one star?

The answer has to do with one of the most counterintuitive realizations of modern cosmology. Our Universe, if gravitationally closed and destined for recollapse (as seems likely), is characterized by zero total energy. Remember that, as illustrated by Einstein's $E = mc^2$, mass and energy are interchangeable. We must consider the Universe's mass-energy, not just energy or mass alone. And energy, in forms other than mass, comes in both positive and negative forms. True, if we add up the masses of the sextillion-plus stars in our universe, they

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make a large positive contribution to the total mass-energy. But those stars are also exerting a gravitational pull upon each other, representing a great deal of negative energy—or what physicists call "potential energy." The negative potential energy of gravitation between the masses in the Universe is always equal in magnitude but opposite in effect to the sum of the mc^2 energies associated with each of the individual masses. The total is therefore always exactly zero!

In fact, all three of the conserved quantities of physics (angular momentum, charge, and energy) that normally keep us from getting something from nothing may well sum to zero in the case of our Universe, and could be expected to do so for any similar baby universes. Nature's conservation laws need not present a barrier to the appearance of an enormous, starry universe out of nothing—or out of the collapse of a single black hole.

Testing Smolin's Theory

Well then, the skeptical reader is wondering, is there any way to test Smolin's evolutionary model? Smolin says there is. If the theory is correct, then our Universe should reveal itself to be, upon examination, just about the most efficient black-hole-producing universe possible. According to Smolin, "We arrive at a prediction that we may expect could be verified or refuted given known physics: The parameters of particle physics are such that most changes in their values should lead to decreases in the expected number of black holes in the universe." As Smolin is quick to point out, such tests of the theory can be performed even without understanding the exact mechanism by which the constants are randomly varied.

As one example of such a test, consider the difference in mass between the neutron and the lighter proton—a difference of about 1.29 MeV (million electron volts). This gives the appearance of being a rather arbitrary value. But would this Universe have fewer black holes if that value were larger? Would it also have fewer black holes if the value were smaller? If so, then the value is not so arbitrary after all, and we would have some strong confirming evidence for Smolin's theory.

According to Smolin, his model passes this particular test. If the mass excess were reversed and the proton were heavier than the neutron, he says, the number of black holes would decrease dramatically. The reason is that for star formation to occur at all, there must be a mechanism to allow the initial cloud of gas and dust to lose energy so that it can condense. For clouds of hydrogen and helium gas the primary mechanism for such energy loss is radiative transfer. If the neutron, rather than the proton, were the lightest baryon, the galaxy would consist initially of a gas consisting mostly of neutrons, rather than hydrogen. Since the coupling of neutrons to the electromagnetic field is significantly weaker than it is for protons, the process of radiative transfer, and hence of condensation, would be that much slower. Thus not as many stars, and ultimately, not as many black holes, would form during the Universe's lifetime.

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What if we allow the proton to remain lighter than the neutron, but increase the mass difference still further? Doubling it would mean that deuterium could not stably exist. Deuterium plays a crucial role in the processes by which the heavy elements were formed, in both the primordial synthesis of helium and in stars. And if the mass difference is increased still further, to 18 MeV, there would be no stable nuclei besides hydrogen, and hence no nuclear fusion. In this case there is no stellar evolution, no supernovas, and no ongoing generations of star formation. Does any of this help Smolin's model? Not really, because all it means is that many more stars would collapse to black holes (because they don't throw off any mass by going supernova). So it turns out that the alternate 18 MeV universe would be worse for life, but better for black holes, and hence not good for Smolin.

But not to worry, he says—there may be a way out. In our present understanding of the star formation process, chemical reactions, taking place on the surfaces of carbon dust grains, play a major role in cooling the clouds in which new star formation is seen to be taking place. From this we may conclude that the star formation process depends importantly on the presence of carbon and other organic elements, and hence would be very much altered if the neutron-proton mass difference were increased. Of course, star formation would still occur in the absence of higher elements—it *must* have, for the first generation of stars. But stars would presently, in the presence of interstellar carbon, form more quickly than they did in the first generation, which means, according to Smolin, that we may wind up with more black holes in the long run after all.

Critical Responses to Smolin's Model

Science popularizer John Gribbin, an outspoken proponent of the idea that this Universe is a living organism, is enthusiastic about Smolin's idea. Daniel Dennett, in his popular new book, *Darwin's Dangerous Idea*, also sings Smolin's praises. Darwinism, after all, is supposed to be extraordinarily effective at explaining away apparent design in the biological realm. Shouldn't we expect that something similar should be able to do away with the Argument from Design in the cosmological realm as well?

But the popularizers seem to be unaware of a strong critique of Smolin's proposal published by the cosmologists Tony Rothman and George Ellis shortly after Smolin's paper appeared. Although Rothman and Ellis are sympathetic to Smolin's attempt to apply a Darwinian-style explanation to the problem of cosmic fine-tuning, they find that Smolin's model doesn't adequately pass the tests that Smolin himself proposed for it.

For example, recall that Smolin argued that a universe in which the proton was more massive than the neutron would be less optimal for black holes than this one. The universe would consist primarily of neutron clouds rather than hydrogen clouds, and neutron clouds would not con-

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tract to form stars as quickly.

Rothman and Ellis, however, provide more complete calculations showing that a neutron cloud collapses on the same timescale as a hydrogen cloud. They also give reasons why hydrogen clouds might actually be expected to collapse more slowly (for example, electron opacity in hydrogen clouds would impede the transport of radiation, and slow down cooling). So a neutron-dominated universe should have at least as many black holes as a proton-dominated universe, and Smolin's model fails this particular test.

For the case of a neutron that is much more massive than the proton, recall that Smolin found greater black hole production in this alternate universe as well, but felt this was mitigated by the fact that in such a universe carbon could not be produced, and interstellar carbon can be expected to help stars to form in later generations.

Rothman and Ellis, however, point out that simulations of star formation appear to indicate that in the initial stage, at least, gravity dominates the process, regardless of what is assumed about the composition of the cloud. Furthermore, they say, it would appear that the addition of complex molecules and dust could only increase the cloud's opacity, in which case collapse would proceed more slowly, decreasing the black hole birth rate. Again, say Rothman and Ellis, it appears that Smolin's conclusion is probably reversed.

But Smolin's biggest mistake, according to his critics, is that he is implicitly linking the existence of black holes to the existence of long-lived stars. Specifically, he seems to be forgetting about the very many tiny primordial black holes that could be formed in universes having clumpier initial conditions than our own. As Rothman and Ellis say, "From the point of view of tunneling to new universes, primordial black holes would serve just as well as stellar remnants. Thus, natural selection should produce universes with large numbers of primordial black holes. Yet, the 'generic' inflationary model is exactly the one that suppresses primordial black hole formation by damping out inhomogeneities. At least any inflationary model that produces fluctuations compatible with the COBE limits will not produce primordial black holes."

The key problem is that a large population of black holes is not equivalent to a large population of stable stars. Rothman and Ellis go on to discuss other examples in which a universe could be altered to produce fewer long-lived stars (which would be bad for life), but more black holes (leading to advantageous cosmic reproduction). Such examples appear to be nails in the coffin of Smolin's ingenious idea; the universes having the most black holes would no longer be the universes capable of supporting life. His model loses its power to explain the existence of a universe capable of supporting any appreciable degree of chemistry and complexity, since such would no longer coincide with a universe that is favored by his model of cosmological Darwinism.

Smolin's idea has such a strong appeal, however, that Rothman and Ellis

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are hesitant to close the door completely. They suggest that it may be possible, for example, that there is a preferential tunneling rate to new baby universes that depends on the mass of the black hole that has collapsed, and thereby excludes microscopic primordial black holes from consideration. They do not suggest any way to overcome their own objections involving the proton-neutron mass difference, however. But it's conceivable that, upon taking all the fundamental constants into consideration as a complete set, rather than just one or two of them, we would eventually find that universes similar to ours do indeed turn out to be precisely the kind that are most efficient at producing numerous similar offspring. Although we can't currently see how, it remains a theoretical possibility that Smolin's model of cosmological Darwinism could be ultimately vindicated after all.

Combining Intelligent Artifice and Natural Selection

In the wake of Rothman and Ellis's convincing critique of Smolin's model, E.R. Harrison has attempted to shore up the idea of cosmological natural selection in a way that, intriguingly, also incorporates an element of design. He contends that, as shown by Farhi and Guth, it may be possible to create universes under controlled laboratory conditions by forming a black hole of about 10 kilogram mass from particles at an energy of about 10^{15} GeV (billion electron volts). The physical constants in the offspring universe would then probably have similar values to those in the parent universe. With this suggestion, Harrison avoids the need for a connection between the spontaneous development of black holes and the conditions necessary for life. Once a universe randomly arises that contains technologically advanced life, Harrison says, its inhabitants would eventually create new universes hospitable to intelligent life. Universes containing intelligent beings would then be more likely to reproduce; universes not containing intelligent life would remain relatively barren. Eventually, given these preferential reproductive conditions, universes like our own, leading to the existence of technologically advanced beings, would come to be the most prevalent among the ensemble of universes.

The problem, of course, is the question of how the first finely tuned parent universe containing intelligent beings came into existence. Harrison's model in effect merely pushes the fine-tuning puzzle back to some other, original universe—and for *that* universe we find ourselves back to the same two explanations that were current ten years ago. Either the existence of the first universe capable of developing complex structure was virtually guaranteed by the existence of a vast array of randomly different universes; or the universe was designed by a cosmos-transcending intelligence. The progress, it turns out, has been minimal, but the discussion has been fascinating and certainly worthwhile.

Is Design Dead?

There are, then, not two, but three possible and quite distinct paradigms

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for explaining cosmic fine-tuning: the explanation by Design; the explanation by assuming that virtually any type of universe that can conceivably exist, actually does exist; and the new type of explanation by what might be called intercosmic Darwinism. All imply unimaginable realities beyond our own cosmos. The last, as developed by Smolin, has the virtue of being testable. Although it so far seems to have failed the tests he has proposed for it, whether it has yet been tested comprehensively enough to be conclusively rejected remains in some doubt.

And if Smolin's proposal eventually makes a comeback and passes all the most important tests—if we find that universes like ours are optimal baby-universe-producing machines—what then? Would this eliminate the relevance of a theory of Design?

Not according to physicist Paul Davies. "It is worth noting that it is perfectly consistent to believe in both an ensemble of universes and a designer God," he says. In fact, it may be necessary. Even if we find that we do indeed live in a universe that appears finely tuned for the sole purpose of maximizing black hole production, supporting Smolin's evolutionary hypothesis, profound questions would remain. How would we explain why there are so many instances of fine-tuning which are necessary for the existence of life, while seeming to have no relevance for the existence of black holes? A smaller ratio of electron to proton mass, for example, or a significantly weaker electromagnetic force, would make organic chemistry impossible.

And getting back to cosmogony, we still have no explanation for the appearance of the seed universe that got Smolin's transcosmic evolutionary ball rolling. The puzzle of the origin of this Universe becomes the puzzle of the origin of all universes. One may respond, as many have, that universes could originate spontaneously out of nothing, given only the laws of quantum physics. Unfortunately, this is a self-contradictory explanation, because the laws of quantum physics are not equivalent to "nothing." The pesky question remains of why quantum physics itself exists, without which even the quantum cosmogonists could come up with no universes at all, ever.

Broadening the scope, how are the entirely nonmaterial entities of mathematics, together with our ability to independently discover them, and their unreasonable effectiveness to the physical universe, to be explained within any purely naturalistic framework? As cosmologist Roger Penrose has said, "There must be some deep underlying reason for the accord between mathematics and physics, i.e. between Plato's world and the physical world." Richard Feynman, whose colleagues at one time voted him the most brilliant man alive, expressed a similar sense of perplexity in the face of the nonmaterial but nonetheless objectively real realm of mathematics: "When you discover these things (mathematical truths), you get the feeling that they were true before you found them. So you get the idea that somehow they existed somewhere, but there's nowhere for such things. . . . Well, in the case of physics we have double trouble. We

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come upon these mathematical interrelationships but they apply to the universe, so the problem of where they are is doubly confusing. . . ."

The brute metaphysical fact will always remain that the nonmaterial existence of mathematics and the ultimate laws of science, whatever else they may prove able to explain, will never be capable of explaining their own existence, or their own applicability to the cosmos (singular or plural). We can explain much with science—but not science itself. Whether cosmological Darwinism turns out to be true or false, it seems doubtful that we will ever be able to dispense with the apparent need for still deeper levels of explanation for the ultimate source of life and meaning. ■

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Anything that interferes with individual progress ultimately will retard group progress.

—George H. Houston

Metaphysics is an attempt to prove the incredible by an appeal to the unintelligible.

—H. L. Mencken

Men will be on their backs, talking about the fall of man, and never make an effort to get up.

—Henry David Thoreau

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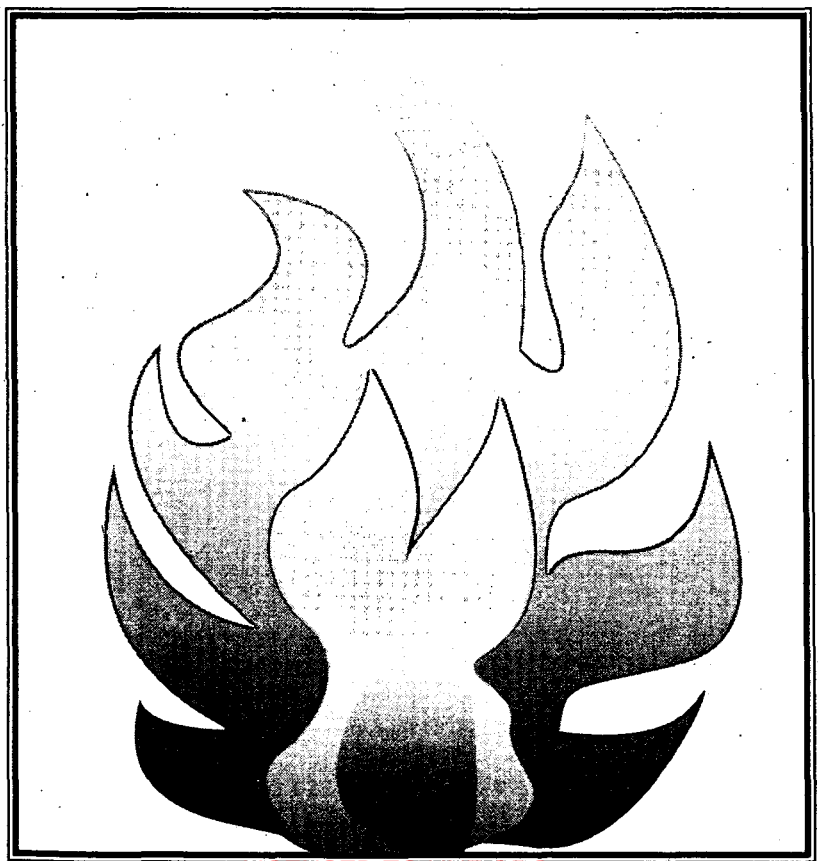
Probability Zero

SUFFICIENTLY UN-ADVANCED

MARK RICH



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"How *do* we get out?" said Effie.

"Not sure," said Ned.

He pulled a tuft of his red hair, straightened his white, dirt-repellent shirt-sleeves, and stepped forward to try the door again. No dice. He shot a glance at Effie, hoping to look as handsome as she looked entrancing in her Swerve-Fit skirt-suit, the seams of which adjusted with her every movement. Her hairdo—a lively chocolate affair—changed with her moods. It looked a bit shy, before. Now it had an unnerved quiver to it.

And here they stood, locked in.

The museum had emptied. The others would be down the street. They planned to meet for coffee before leaving first for the shopping mall nearby, then for the hotel. It gnawed at him, that the guide might usher everyone else into the bus, leaving the two of them behind.

"That docent must be here somewhere," he said.

His hard soles clicked across the floor; her soft ones murmured alongside. It gave him a quiet thrill to take decisive action. The two of them, true enough, faced no greater peril than being locked in: yet missing the bus—! Who *knew* where the others might eat tonight?

And any moment now the lights might blink off, leaving them here among the cast-offs of the past—alone. In the dark.

Ned spotted the docent—Carlton—just in time to quell in-the-dark-with-Effie imaginings.

"Carlton! Carlton!"

Carlton saw their alarm and took alarm himself. "What's the matter! Something wrong?"

"We're locked in. We'll miss our group!"

"Locked in? Can't be. Closing's not for—"

"We *tried* the door," said Effie.

"Two, three times," Ned said.

"*Could* you—?" said Effie.

"I'll see what I can do."

Carlton led with long strides. Ned caught Effie's eye and nodded. Out of this jam in a jiffy, and hadn't he acted the tough sport through it all? She flashed a smile.

That afternoon the whole party of them, fifty-strong, had jammed through the open doors of the museum intent on finding revelation—which they found in abundance. Jostling shoulders at displays, Ned found himself bumping into, acutely noticing, and paying increasing attention to this Effie. They took in the museum at a more relaxed pace after that.

With *this* result.

Hurrying back to the door, Carlton led past dioramas that had fascinated Ned: the technology of fire.

"Long ago," Carlton had said earlier, "fire technology took the form of two wooden sticks—remember wood? Ha! Anyway, take two sticks, joined with string. One twirls the other against yet another piece of wood, spinning it so fast the friction heats it to burning. If you claim your fire comes from two sticks, most people think you mean magic wands! People forget about friction, especially with so much maglev transportation around.

"Here," he had continued, "we have flint. Who knows about flint?

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Anyone? No? Not surprising. It's a stone that sparks, when struck with steel. Magic, to the uninitiated. A few decades ago, maybe more, people used cigarette lighters, or similar devices for lighting gas flames, with flint in them—actually a sort of artificial substitute: another advance! But nowadays, only antiquarians and geologists know flint, seems like.

"In fact it's getting so that few remember that 'match' means anything else than—well, as in the phrase, 'match made in heaven.' People don't light fires much, which means matches have pretty much fallen out of use, at least in this country.

"But then," Carlton had said, *"fire* has fallen from use. There are people—I've met a few—who don't think there *is* such a thing as fire any more. We don't light cigarettes. Don't have fireplaces, as we did when wood was so cheap you could burn it. Buildings and everything else—they're fireproof, so you'll never see one in flames. Some people go through life without seeing actual fire!"

How long since *he* had, Ned had wondered.

"To these people," Carlton had added, "even fire itself—the oldest technology of all! Even *fire* seems magical—because it's outside their experience!"

The trio reached the door. Ned felt breathlessly athletic after walking there so quickly.

"Oh, it *must* open," said Carlton. "Try again."

"OK," said Ned. He stepped onto the mat.

Nothing happened.

"Go ahead," said Carlton. "Give it a try."

"I *am*."

"No. Turn the knob!"

"Knob?"

Carlton demonstrated.

"Really!" said Effie.

Ned gaped at the contraption inside the door: a cunning device that locked into or withdrew from a corresponding socket in the door frame, depending on how the "knob" was turned. Who could have thought such an obviously non-electronic thing would work?

"You mean with just one *hand* you can open a door—without needing to step on the mat?" said Effie. "No electronic eyes? No voice commands? That's impossible, isn't it?"

"*All* doors open by themselves," said Ned. "That's what doors *are!*"

"But a touch on the knob—and presto!" said Effie, twisting it again, as if for good luck. "I don't believe it."

Ned stepped out after her. Flustered at finding Effie's hand briefly in his, he barely heard Carlton:

"It's like I keep saying," he said, a bit sadly. "Any sufficiently *un*-advanced technology seems like magic." ■

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Arlan Andrews, Sr.

WWW: THE WEB WE WOVE

Some history they didn't teach you in school—but it explains a lot!

You just can't tell about History. I mean, things are changing so fast, it sometimes feels like the very past itself is not as solid as it used to be. At least that's the take where I am. Or is that *when* I am? The terminology isn't too precise. And here at AT&T (at least before it got broken up into a bunch of smaller, almost incoherent organizations), we engineers and scientists used to pride ourselves on lucid, accurate, precise, and correct terminology and language. However you say it though, one thing *is* clear to me: *nothing* is what it seems to be to all of you who work outside The Phone Company. History, least of all.

Let me try to make that a little clearer.

Have you ever had the feeling, during the last ten or fifteen years, that history just was not happening like we all thought it would? How strange that the world's bad guys just sort of gave up and went away without a fight? How so many kinds of weird people and unusual ideas and outrageous political movements have sprung up, have even won elections? How even the historians can't seem to agree on history any more, and how we argue about even our memories of recent events? I've got news for you: history hasn't been what it should have been. It isn't even staying the same.

And, my friends, that is truly *scary.*

I first experienced It over thirty years ago, when I got into Bell Labs, and by deep thought and worthy deed and sincere action convinced The Powers That Ought To Be how I was fit to be one of them (or at least on their team), and thus finally got my soul-grabbing alphabet soup of clearances. I accepted It with all my other duties, and took some pride in the

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fact that we in The Phone Company had undertaken such a cosmic task. Hey, it was the early 1960s (not "THE Sixties," *they* didn't arrive until about '65 or so), and way back then we did as we were told. Well, more or less.

Anyway, I didn't know the rest of the world knew anything about It until I happened to be at a drunken party at the 1985 World Sci-Fi Convention in Auckland Down Under. The room was jammed with sci-fi writers of all kinds, and as a guy fairly new to the field, I was kind of hanging out at the periphery, hoping my party trajectory would take me into an orbit that led ultimately to intersect with a Hugo winner somewhere, preferably a hard science type like Jerry or Larry or Charles or Greg or Hal or David or Poul. While I mused so, a tall, dark, and hairy author sidled up to me and whispered, "Where were you when the world changed, Arlan?" I gulped involuntarily and he stared down at me as if I Knew. Of course, I Did.

"You mean," I replied, looking up as innocently as I could, fighting down the urge to panic, "when Apollo landed?"

He shook his head. "No, not that. When Things Changed." I could hear the Capital Letters, he was that good. His voice lowered even further, and I practically had to stand on tiptoes to catch his speech, even though I didn't really want to hear him say it. He was not a Company Man, after all. "I mean, Arlan, when all these alternate universes, alternate histories, started becoming *our* reality?" Damn it, he Knew! Inwardly I groaned; this would mean stacks of reports to be filled out, and assessments of situations, and loads of other paperwork I didn't want to think about during the Sci-Fi Con.

"Eric, I don't know what you mean. You're talking about the new markets in sci-fi novels, the alternate-history ones you've started doing?"

Shaking his head, Eric snorted and grabbed me by the elbow, leading me into the smoking-room section of the Sci-Fi professionals' party, where a heated debate was in progress. He shoved and squeezed, manipulating me into the heated core of the ongoing belligerence, and I found myself sitting cross-legged on the floor in front of a bedful of various famous, and nearly so, sci-fi writers.

One of them was obviously tipsy as well as loud, but fascinating for all that. "Hellfire, I can tell you when It All Changed—when Hinckley's bullets missed Ron Reagan, right there in front of the Hinckley Hilton, downtown D.C. In the real world, George Bush became president in 19 and 81 and we didn't get this godawful arms buildup and the trillion-dollar Star Wars program that's going to destroy the economy and the world."

Interesting thought, I thought, *but way off base.* Behind me a challenging voice chirped up, "No, in the real world, Lennon shoots Reagan. US declares war on Colombia."

"Colombia?" somebody asked.

"Hell, yes. It's Lennon's Colombian *coke* that makes him do it!" The whole room roared in hilarity, marking the high point in the conversation, after which time the roomful of brilliant, creative, and weird minds latched onto other emerging subjects

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and the theory of How Things Had Changed evaporated into the stultifying mixture of smoke and air and body odor.

I uncrossed my legs and motioned Eric to meet me outside, on the patio past the sliding glass doors. Outside, he picked up the conversation. "Arlan, there you go. They know it, too. We've all of us sensed that things have changed. Trouble is, we just can't pinpoint exactly when."

I started to speak, but Eric held up a palm. "No, hear me out, really. I think we in the sci-fi field are just more attuned to alternate history, and I'll be damned if I don't think you and I and the rest of us"—he gestured toward the laughing crowd back inside the room—"are off on some kind of tangent, a bifurcated history or other weird timeline."

I breathed deeply, controlling my initial fears. *He doesn't Know. He's only speculating.* I took comfort in that thought, but a more disturbing one took its place. *But he does feel it, they all do inside there.* I shrugged mentally. *I can't tell them, but they ought to feel lucky to be in one of the Seven Known Alternities. What godawful things might be happening in all the rest of the Infinitude?*

Let me interrupt here to tell you The Story: How Things Were, How Things Got Cross-Wired (Literally), and How Things Came Apart. And ultimately, how that has to do with What We (*Used To*) Do At The Phone Company.

Time: July 1964. Scene: Bell Telephone Laboratories, Murray Hill, New Jersey. A secret chamber, half a mile below the surface, bright fluorescent lighting, walls daubed a dull light green. At the head of a class a lecturer speaks.

"Lady and gentlemen, you have, every one of you, successfully completed all the intensive coursework, endured the extensive barrage of testing, and secured your comprehensive security clearances." The neatly dressed preppie scientist—all dark suit, white Oxford-cloth shirt, shiny thin tie, and blond crew cut—smiled at his little wordplay and several of my class of ten new recruits nodded and returned the smile. I didn't; I felt like we were on the verge of some spectacular revelation and I leaned forward to catch every word.

"You have taken all the courses, you have understood the growth of the Bell System, all the way from Dr. Bell and Mr. Watson, through Mr. Vail, through the step-by-step Strowger switch up to today's Electronic Switching System, the ESS Series that we are this very day installing for the first time.

"Does anyone know why we have spent billions and billions of dollars to replace perfectly good seventy-year-old technology, switches that have operated almost failure-free since they were invented by that undertaker who wanted to ensure that no human operator would take away his business by plugging them into another mortuary's phone line?"

"To make more efficient the U. S. of A. phone system," one greenhorn volunteered. An Indian. From India.

"To make more money." "To get

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calls through faster." "To service the customers." At each of these rapid-fire answers from the audience, the lecturer smiled and shook his head, pointing at yet another raised hand

"You're all correct," he finally said, pacing up and down in front of the lectern, "those are good reasons, and each of them will happen. But," he spun on his heel, splaying all ten fingers at us, "each of you is also *Wrong.* The real reason has to do with our vast wired network, the millions upon millions of interconnections we have made, the untold quadrillions and quintillions and octillions of possible interconnections among these customers that are possible."

His voice now a whisper, the lecturer turned and pressed a large red pushbutton on the wall behind him. The entire wall rolled away, revealing a rough surfaced rear-projection screen. "I am now ready—you are now ready—to understand the whole truth behind The Phone Company. Why it must remain one unitary system, at least in the U. S. of A., why we must maintain our interconnected network as the world's leader. The rest of the world, backwards as they are, they'll never catch up. And for us, that's good. They won't get the Alternities goodies like we do."

The class, me included, gasped as the rear-projection screen suddenly filled with the five words that changed our lives: *There Are Seven Parallel Universes.* The lecturer smiled at our gasping reactions.

"How can there be?" the Harvard man said, standing and pointing to make his point.

"Simple," came the answer, "the Many-Worlds Theory of Quantum Mechanics allows an uncountably infinite number of parallel universes, each stemming from tiny decisions in a mother world. Next question."

"How do we know this?" This from the lone female in our class, a nerdish but shapely and attractive woman with the unlikely last name of Borg.

The rear-projection screen faded its stunning revelation, replacing it with an image of thousands of overhead wires in 1890s New York. "Around the turn of the century," the explanation came, "The Phone Company started getting complaints about unknown crosstalk—voices that shouldn't have been there—especially in New York. Close investigation by the Western Electric research team revealed that the strange voices were not coming from our subscribers, but from elsewhere. Where 'elsewhere' was, they couldn't tell.

"But the situation grew more serious as we jammed more and more wires into a given city. Those early pioneers tried filters, everything, to cut down on the unwanted noise. It was only when they set up an experimental lab and talked to some of those other voices that we finally understood what was happening, that we were able to establish two-way communications with other alternate worlds, worlds of different *histories.*" We were spellbound, and the lecturer obviously was enjoying himself. "I mean, can you imagine what happened when Dr. Alexander Graham Bell, US citizen from Scotland, found himself speaking with Dr. Ing. Alexan-

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dre Lighthorse du Belle, citizen of the Confederate States of North America?"

We all sat gaping, stunned but not disbelieving. The wildest stories of science fiction were true! Yet there was more to come.

"But it was only when Bell Labs got into the picture in the 1920s that they found out *how* it was all happening—the real reason that there ever was a Bell Labs in the first place, you may have guessed. And the secret was, the enormous number of interconnections, the huge number of miles of bare wire all interconnected and switched together, somehow induced connections between our universe and several of the closest parallel universes." The lecturer shrugged. "Again, this has something to do with the eigenvalue solutions of the Wave Equation, they say. Beyond that, you get into spinors and I can't answer anything. I just know that our new electronic switching system will make those inter-world communications much faster and better than ever before."

"Why only *seven?*" Borg asked.

"We surmise that only six alternate universes have been sufficiently wired up, like we are, to allow the parallel universe induction to occur."

Harvard man, still standing, turned to lecture the rest of us. "So, either those are the only six, or only six of an infinite number of parallel universes. Either of those possibilities is staggering. What a concept!"

The rest of that day was a wonder. We learned that all of the parallel-Universe analogs of The Phone Company had cooperated to share information among themselves. We got the deForest triode amplifier, we gave the Strowger switch; we got a rather primitive version of solid-state physics; we traded them Claude Shannon's work on information theory. And on and on, up through masers and lasers and aerogels and virtual reality, a profitable collusion of seven cornucopias with secret knowledge. Based on the benefits of this arrangement, The Phone Company early on had secretly convinced the government to maintain a monopoly in this country; to break up such a scheme would have cost us immensely.

And, to hedge against our foreign cousins finding such a treasure house, we sent secret emissaries abroad to ensure that no other country would ever be so wired as to access the alternate worlds. In the British Isles, for example, we made sure that the venerable Post Office would run their system. In all the other monarchies, we were able to whisper about the threat to security that unfettered telephony among the peasants might pose. After many years, only tiny Finland was able to construct any system comparable to ours. Fortunately for us, this little country never met the minimum parallel world induction requirements, and so no other nation ever found out about It—until . . .

For most of this century, The Phone Company had It made, and the rest of the country along with us. But sure enough, somewhere along the line, we got too complacent and someone else caught on. We figure it must have been when the scientist W. Edwards Deming and his entourage

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went to Japan in the late 1940s to teach the defeated enemy how to manage quality in their reborn factories, teaching them all about Bell Labs' statistics. Some smart Japanese must have figured out our secret, because in the late '40s they began wiring up Japan every bit as heavily as we had wired the US.

"OK, so they're coming aboard, so what?" was the general line taken at our New York HQ. "Maybe we can learn something from parallel-Japans as well." But those wise guys had learned our whole game, not just the technical side: they began to lobby inside our government to break our wired system apart, to make us fall below the parallel-worlds induction level. And they did, and it worked; we in The Phone Company had failed to continue to convince the powers-that-were of the benefits of our system. Personally, I don't think some of them in Washington ever even believed we talked to other worlds.

To make a long and bitter story very short, this is what happened: on January 1, 1983, as required by law, the Bell System was divided into seven smaller "Baby Bells." I was in a regional switching control office, watching the huge display screens as the long lines were physically separated at the switches. To my sorrow, as region after region of the US went dark, I could see the connections to the parallel worlds winking off, dissipating. Within minutes, all connections to the goodies and freebies of six other Alternate Phone Companies were severed, and for the first time in over eighty years, we at AT&T were Alone.

There is no need to detail the enormous personal sacrifice we all felt, especially those 20,000 persons who had lived their lives to maintain the nodal points where inter-universe communications had been taking place. They were, of course, laid off. No one ever revealed The Secret because they wouldn't have been believed, and jobs were scarce, and each one needed a good reference to find new work elsewhere.

You can probably guess the rest of the story, at least the obvious parts. The Pacific Rim countries wired themselves up, pell-mell, putting in communications capacity they would never need, all in hopes of accessing the treasures of the parallel worlds. And by the mid-'80s, it became apparent they had made induction work: the enormous number of innovations in consumer products, in electronics, in just about every field, crushing our homegrown companies, causing unemployment and misery all over our land.

Oh, in a few places where we had supercomputers and the alternate universes had them in the same place, we maintained a minimal set of contacts, so that places like Los Alamos and Sandia and NASA occasionally got the rare jewel of research information. But nothing really useful to society at large.

This is, of course, the obvious part, something everyone could figure out, given the true picture of parallel worlds.

But there were non-obvious, non-public consequences as well, things that we at AT&T didn't find out till later, too late. It turned out that each of the newly independent Baby Bells

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went hell-bent for induction, each on their own, and were already prepared, secretly, at the cut-over date, to maintain their own parallel induction capabilities. They didn't miss a lick, although there were problems. Trouble was, rather than having one large, coherent system, the induction was locally strong in some places, weak in others. Result was, some Baby Bells could access some of the usual six parallel worlds, but because of massive concentrations in some cities, other Baby Bells started picking up *many more* parallel universe systems.

Some of those new worlds were really weird, I found out later. The information anybody over here got was sporadic, sometimes nonsensical (ESP machines? Inertialess drives? Video games?) Some worlds had their inductive wiring systems jammed up in one or two regions; there's an Etowah Nation that talks in Cherokee to what used to be BellSouth; a Republic of Fremont in the Bay Area only; an Arabic-speaking parallel nation in Arizona. An incoherency of alternate worlds, which turns out to be a real mess.

All of that occurred real quick-like on January 1, 1983—the *Real Day Everything Changed*, when the alternate worlds began to get out of synch. There were bigger problems to come, though, much bigger. We had the seven Baby Bells wiring up to beat the band, and the Pacific Rimmers doing the same. You add to that the gargantuan increase in wiring our cable TV systems in particular, and by the late '80s we were getting much *too* coupled to those other worlds. Sometime in that period, *the past itself* began to waver.

Since Bell Labs had been mostly broken up into ineffectual consumer-product groups, and since nobody else cared too much about nationwide telephone network research, there hasn't been anybody to study the problem, but the last I heard was this: because of the scattered concentrations of wiring interconnections, some kind of balance among the parallel worlds was upset. Things got chaotic; result was, the past of World One (ours, naturally) got interchanged with the past of another world, and they all got mixed up, fairly randomly. We at AT&T began tracking the manifestations—people who swore they'd read that one famous person or another had died, but then found out it hadn't happened. Things once lost turning up where they been searched for before, and vice versa. Anomalous artifacts in archaeology, weird lights in the sky, strange cults and sects, independent Presidential candidates, the whole works. And worst of all, a vague feeling permeating society that Something Had Changed.

We at AT&T grew horrified—suppose last month's long-distance calling charges got shifted to another world as well? What if *our* past got shifted into some world with higher taxes? An accountant's nightmare! We couldn't have all our remaining investments at risk. So we got together with the other long-distance carriers and in unison we attacked the problem on all fronts, even got the Feds and all of their Labs involved. Suddenly, networking studies, neural nets, AI, became the big

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thing. Our secret Internet fairly hummed with hypotheses, with possible solutions.

What we found was, with the profusion of more and more electronic products, with more and more PCs and laptops, the problem is just getting worse. Pockets of past-shifting are occurring randomly all over the world; business records, investment accounts, even genealogies are no longer solid. Historical "revisionism" is rampant, as different sets of scholars write on things they actually researched and remember, from sources that once were valid. Politics have changed so sharply that forty-year trends have reversed themselves; one election the people want big government, the next, a smaller one; and the most incredible politicians, ones who would've been jailed in previous years, get themselves elected over and over again. (Well, when the past changes, memories get confused and the populace responds accordingly—unpredictably.)

Actually, there is one solution to this situation, and all of us Phone Companies decided to do it a few years back, but it's rather scary, too. With secret help from a government agency that was in The Know, we have been going full-bore to wire the whole world up in one unified network, to grow the Internet—with its information-rich video and sound version, the World Wide Web—so wide and far and fast that we will quickly warp our whole planet into one unified, stable history line, presumably a consensus past acceptable to most of us. The uncertainty is unnerving, but at least we're better off than some worlds, at least we have a chance to stabilize our own past. And we Phone Companies here in World One are pushing as hard as possible, before another alternate world steals *our* history.

Because as bad as our known history is, we could have done worse. In some of those unfortunate other worlds, various incarnations of Monopoly still reign: weird things called a World Soviet Union, a Unified World State, a Corporate Continuum, an Axis Hegemony, and Le Monarchie du Monde de Napoleon XII. And in one particularly pernicious parallel universe, their version of the US government is even trying to add a 'back door' to each of their communications chips, a secret way into the network so that Big Brother can subtly intervene electronically whenever it senses a threat to itself, and prevent its Phone Companies from stabilizing their world's past. From that regime's horribly perverse viewpoint, a changing past is preferable to an unknown past that might kick them out of power.

Of course, you might expect such shenanigans from a world in which the US re-elects as a President some oversexed Yuppie yahoo. Thank the Eight Hundred Gods that in our own enlightened world, the Co-Regents are both ex-sci-fi writers who understand these kinds of things and are letting your Phone Companies, like us here at Alternate Telecoms & Telechron, try to nail down the past once and for all.

You just can't be too careful about History! ■

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TRIAL BY ORDEAL

Who should handle first contact?

Illustration by Vincent Di Fate

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I heard his steps long before I saw him coming. I knew from the labored tread and huffing breath who it was—Ronald Hickok, one of the contact team; the group responsible for negotiating with the Onalbi.

Well, I'd given them something to negotiate about.

He scrambled to the top of the rock where I sat and collapsed heavily next to me. After he caught his breath, he finally spoke. "They treating you OK?"

I nodded. "No complaints."

His arm swept across the periphery of my vision. "No complaints? They give you a rock valley to live in, no shelter, no food—"

"They bring me food," I corrected.

"Yeah, yeah, I know," he said. "And you built yourself a little mud igloo to live in, too, but it's—"

"Ron, I don't need a mansion. All I need is protection from the elements and food."

He grunted and I could hear him fumbling in his pockets. "I brought that pair of socks you wanted," he said, placing them next to my hand. "You know, I think they'd let you have more if you'd only ask. A view screen, maybe? How about—"

I waved him to silence. "Nothing."

"Paul, I don't get you. Sitting out here all alone, staring at the rocks with no one to talk to and nothing to do. How do you stand it?"

Shrugging, I replied, "You know how people are always saying that they'll get around to doing something important one of these days when they have time? I've always meant to hang my soul out on a line to let it air out, and this seems to be as good a time as any to do it."

He inhaled slowly, then let it back out just as slowly. "Why do you talk that way? You don't have to torture yourself. I think we could at least talk them into keeping you someplace more civilized—in a building, for starters, where you're out of the weather."

"I'm fine. Just think of it as penance, if that makes it easier for you."

"Well, it doesn't. I mean, they haven't even had the trial yet and you're already being punished. It just isn't right."

"Right by whose standards?" I asked. "Ours? Theirs? Some arbitrary set of rules determined by a third party? Who gets to decide the rules? I have to set an example. Let there be even a hint of anything less than justice and we and the Onalbi will feel the echoes of it until the end of time."

He pushed to his feet and stared down at me. I turned to look up at him.

"You're crazy," he told me. "You wear guilt as though it was some kind of armor. What if they kill you?" His arms scissored in the air in a clumsy imitation of an Onalbi's pincers. "What good will your armor do you then? Let us at least *try* to save you."

I shook my head, looking up at him. "No. We'll do this my way, which is to say, their way. *They* are the ones which must be satisfied. That's the only way we'll ever have a future together."

Hickok started to say something more, thought better of it, then clambered back down off the rock as un-

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gracefully as he had climbed it. From there, he walked across the bottom of the depression, climbed the side, and was gone. I'd see him again in a few days, when the delicate balance between his conscience and his dislike for me tipped far enough to make him come to see if he could save me from myself and the Onalbi.

My name is Paul Walker. I'm twenty-eight years old, the son of a philosophy professor and a dance instructor. For as far back as I can remember, I dreamed of space. One way or another, I wanted to go to the stars. I told myself I'd pay any price . . . and thought I meant it.

It didn't take long to determine that I wasn't going to be the captain, or the pilot, or even the navigator. I wasn't going to be a scientist, either. You want the honest truth? I was just too damned lazy to study hard enough. Now, with hindsight and a little bit more maturity, I look back and yearn for missed opportunities. A bit less beer, a few more nights with my nose to the grindstone, and I might have made it out as something more than a cook.

But make it, I did.

As a cook. Nothing more, nothing less. I made it aboard the *Gorbachev* as one of the lowliest of grunts. The stars were mine, even if I only saw them occasionally. We made landfall on five lifeless planets. I stood on each one, usually the last person to set foot on the surface.

The sixth planet was the jackpot. Not only flora, but fauna. Ecstasies of discovery. While we were still in orbit, everyone was sleeping three hours in twenty-four, maybe five if they were particularly exhausted. Back to the instruments, hurried discussions, impassioned arguments, new data, new theories, dashed theories . . . it went on and on. I went about my business patiently. It was obvious that we'd be here a while and all I wanted was a chance to stand on the surface before we left.

Meals I cooked and more meals I cooked. Some things just can't be automated if you want them done properly. Time passed. The rudiments of understanding were hammered out between the scientists. A basic foundation was laid that all other studies could build upon. Geology, botany, oceanography, you name it, every specialist on the ship got to put in his or her say, and a consensus was reached. We landed. There was work to be done here, much work. I was only a cook, and I had to bide my time.

Finally, I was offered my chance. Would I like to go outside? Of course! Permission granted. The atmosphere was not far from that of Earth. Lower nitrogen, neon making up the difference, oxygen slightly lower. I could go out on the surface without a suit—without even a breathing mask.

My first impression was of desert. I'd seen the images on the screens, of course, but that didn't convey the dryness of the air or the sheer vastness of the sky. It was, for all intents and purposes, much like the American Southwest. I went for a walk, aimless.

I rounded an eroded sandstone formation, and there before my astounded eyes was a bipedal creature,

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backed against the unyielding rock, menaced by something like a cross between an ugly lizard and a lobster. It was huge—over three meters long.

The bipedal creature, while by no means human, did have an upright torso, and a recognizable head. Arms . . . it did not lack for arms. My first impression was that it must have twenty or thirty. One lay at its feet, twitching. Blood flowed. It was clearly losing the battle. As I watched, the monster flashed a claw and another arm was missing, this time carried triumphantly aloft, then delivered to the gaping mouth.

Without thinking, I ran towards them, reaching into the pocket of my apron for the butcher knife I habitually carried. A claw slashed at my shoulder, but the creature was clearly caught by surprise. I rammed my knife into the soft skin between two plates on the back of its neck, withdrew, then struck again.

The bipedal creature didn't bother to thank me. It ran.

It took days for the enormity of my error to become apparent. The bipedal creature, while vaguely humanoid, was nothing, a mere animal. The fierce-looking predator was actually the sentient one, simply out for a bit of dinner. Now it was dead, the victim of an Earthling who had assumed that anything with two legs was worth saving.

Now, I would stand trial for murder.

The Onalbi have the death penalty, and they use it often.

A geological curiosity was my little valley. Almost perfectly round, with no outlet. If there were any significant amount of precipitation, it would fill over time and become a lake. It was bowl shaped and I toyed with the idea that it was the scar where some long ago meteorite had blasted untold tons of rock into the sky, or perhaps a volcanic caldera.

There was nothing to keep me from climbing to the rim, and I frequently did so, to sit and talk with my guard. I was not as lonely as Ronald assumed. My guard was scrupulously fair with me. Never once had he—I refer to him as he, although I don't even know whether the Onalbi have genders—done anything even remotely like the cruel and abusive things I would have expected of a human jailer. It was as though he, too, felt the weight of the destiny of our two species, and wanted to make certain that future generations could look back and nod approvingly at his treatment of the murderer from Earth.

The floor of my valley sloped up gradually, becoming steeper the nearer I got to the rim. The first few times I climbed to the rim, I was winded so severely that the most I could do was throw myself on the ground and wheeze, chest heaving. Now, after living outside for the last few months, I had gradually toughened and was able to make it without trouble.

I sat with my back against the guard post and waited for Hresah, my guard, to scuttle around the rim to where I was. He still had a ways to go, so I drew up my legs and rested my chin on my knees, looking out over the empty, sun-bleached land.

Hresah arrived, and switched on

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the power to the guard post. Actually, it was more like one of the automated information kiosks that you see in large cities. He spoke to it, the computer inside translated, and it spoke to me. Over time, I had learned to filter out his actual voice and hear only the kiosk's translation. Onalbi voices were dry and whispery, like the desert wind.

"You are well?" he asked.

I nodded. "I'm well."

"I apologize for being long to get here."

"Don't worry about it," I told him. The one thing that I had asked of the ship's crew was that they bend every effort to get our languages in synchronization. Setting aside my little problem, the sooner we got our words aligned, the sooner we could get our future straightened out. They had done remarkably well, but some things still tended to sound a bit odd coming from Onalbi into English.

"Snow will come soon."

"Really? I know it's been getting chilly, but it's not *that* cold."

Hresah raised his claws out of the way and used the secondary limbs underneath his forward shoulders to prod at the side of the guard kiosk. An image appeared, looking something like different colors of swirling mud—their version of a weather map showing temperatures and isobars and such. He traced the curve of one arc of purplish brown with one of the limber tentacles on his secondary arm.

"See here? How it pushes this way?"

Try as I might, I still couldn't read their maps. A theory had floated back to me from the ship that they might be able see a broader range of frequencies. There might be colors there that I could not see. Presumably in the infrared, from what Ronald had told me. It was a low-priority issue at the moment, but someone would investigate as soon as there was time.

Instead of wasting my afternoon trying to read the map, I put it into more practical terms. "How long before the snow gets here?"

"Early tomorrow morning."

"Could I get you to toss down another tree or two? I'll need some more stuff to burn to stay warm." They weren't trees, of course, they looked more like heavy-limbed shrubs, but that's what the guys back at the ship and the Onalbi had agreed to call them.

"You are empty?" More work needed on that bit of translation.

"Not yet, but I will be if I don't get some more."

"Looking ahead is something that humans do not always do."

All I could do was chuckle and say, "If I had looked ahead, I would not have killed Grenabeloso, and you and I would not be here talking this afternoon."

"You are better at it since you became a prisoner."

There could be any number of interpretations of that, so I asked him to rephrase what he'd said.

"When you first came here, you only looked at the now. Now you look more ahead."

I sighed, picked up a pebble and cast it over the edge into my valley. "I don't know if the computer knows

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the word, but we have a word called maturity. It means that we learn as we go along."

"We learn, too."

"Maturity isn't quite the same as learning. You're already wise when you're born. A human must learn that actions have consequences. Learning that helps give a human maturity . . . the ability to choose the right course of action, even if it hurts now, in the hopes that it will be seen as the right thing later on. If I had been wiser when I was in school, I would have studied harder. Then I would have been able to be more than a cook."

"I do not understand how you can be born not knowing this."

"From what I've been told, you Onalbi live a long time and are not subject to hormonal surges. Your longer life span permeates your entire culture. It's ingrained in you to consider the consequences of your actions—you might live long enough to see them. Also, your more stable hormonal levels don't lead you into some of the . . . ah, impetuous actions that humans are subject to."

"But we are hunters, like humans."

Somewhat oblique, but a good point. Eventually, I nodded. "My hunter instincts were part of what led me to kill Grenabeloso. Humans are territorial. We also tend to protect our own kind. In my haste to decide how to act at the time, I assumed that the *besa* was more nearly human and deserving of my protection."

Hresah waved one huge claw from side to side, a gesture I'd been told to interpret as a nod, even though it looked more like equivocation. "We are not territorial," he agreed. "It is hard to understand how humans feel that they own certain things. How can you own a piece of land, for instance? I have heard you refer to the valley as 'yours' many times, and yet you did not make it. Onalbi only call theirs something that they made. You did not make the valley, nature did, yet you call it yours when even by your standards, it should belong to the Onalbi. How can it be yours if it is ours? I can understand the mud hut. You built it. It is yours. But the valley, I do not understand."

I shrugged, hoping that he understood the gesture. "I agree. The things you say are true. I will think about them and try to have an answer the next time I climb up here to see you."

Hresah laid one fearsome claw next to my thigh. I didn't flinch; it was a gesture akin to placing a hand on someone's shoulder. "Please make that climb happen soon. I will look forward to your answer."

As I climbed back down to my hut, I felt the first whisper of a cold wind. In my imagination, it was the chill touch of the Grim Reaper that I felt.

When I awoke the next morning, the ground was already three or four centimeters deep in snow. The fat, sticky flakes were driving in steadily, with very little in the way of a breeze.

I pushed the mud-covered branches that served as my door back into place and set about nursing the embers from the previous evening's fire to life. The fire had to be just the right size—too small and it wouldn't give off enough heat to warm the hut, too

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large and it would fill the dome-shaped hut with eye-stinging smoke and send me scrambling outside to cough my lungs out. When I had things just right, there was a thin stream of smoke that rose straight up through the round vent hole I'd left in the roof.

The only thing surprising about Ronald Hickok's footsteps outside the door was that I hadn't expected him for another day or two.

"Knock, knock," he called.

"Come in."

"What do I do . . . just push through?"

I reached over and pulled the plug aside. Cold air laden with snowflakes drifted in with him before I got it back into place.

"Thanks," he grunted, hunched over uncomfortably as he inched his way around the fire in the middle of the floor. He sat heavily. "I brought you another blanket. Thought you might need it, what with the snow and all."

"Actually, I think I'll use it to cover the door until I can make a new one. That one's getting pretty crumbly."

He looked disgusted. "Whatever. Look, seriously, let me try to get you inside somewhere, at least. If you catch pneumonia out here, you won't be proving anything to anyone. If you insist, I'll even see if I can scrape up a bed of nails for you to sleep on."

It took an effort, but I refrained from rolling my eyes. "Thanks, but no thanks. I feel fine so far."

He unfastened the front of his parka. "It *is* warmer in here than I thought it'd be," he admitted.

"As long as Hresah brings me wood and food, I'll be fine."

Ronald snorted. "*Huh* . . . I'm glad you're happy. Some of the rest of us are up against a wall."

"The contact group? What's wrong?"

"Everything. We've never gotten past learning the names of the Onalbi. Every time we try to move on to other issues, like what to do about you, the Onalbi seem to want to talk to someone else. They keep acting as though we're just flunkies."

Being the cook means that I know everyone on board. The corollary is that I have opinions about their worth. "Do you blame them? You guys all act like politicians trolling for votes."

He jerked as though I'd slapped him. "What would you do, put the scientists in charge?" he demanded scornfully.

I shrugged. "Maybe. Overall, they're pretty good people, with the possible exception of Farak. Him, I'd keep as far away from the Onalbi as possible." To get him off my back, I shifted topics. "How about the linguistics—"

"Oh, now *there's* a success story for you. To hear them tell it, the Onalbi they're paired with are born linguists. All they have to do is just barely get started on an idea, and the Onalbi take it and run. Eileen says they have an intuitive grasp of things—even things they've never seen—that's almost scary. She was describing our history of transportation to them, working backwards. She told them about cars, then horses, then all of a sudden her Onalbi comes up with the idea for a wagon, being a wheeled ve-

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hicle powered by a horse instead of electricity, and wants to know what we called it. That's in spite of the Onalbi never having used any sort of draft animal at all. They did everything themselves until they invented machines to do it for them."

"Pity the scientists can't get anyone like that to work with."

"Oh, supposedly the Onalbi are waiting for someone. Until that someone gets here, our scientists are on their own. Even the linguist who derived the concept of a wagon won't talk to them, in spite of the fact that he sounds like a pretty smart cookie. The sociologists are saying it's a caste system and they can't step out of their area."

I shook my head. "I don't think so. I've met several and they've acted pretty equal towards each other."

He sneered. "The ship's cook speaks with authority. I'm sure they'll be waiting with bated breath for your assessment when I get back."

I guess I deserved it—I'd insulted his contact group. "If it's a caste system, I'll be real surprised."

"They think it explains why the contact group can't get anywhere. Somehow, we're the wrong caste."

"Not so much of a caste . . . more like a peer group, and your contact group may not measure up to their idea of someone they'd want as a peer." I confess . . . I did that on purpose.

"Well, if *you* get to chose a jury of your peers," he snapped, "you'd better get started, because it may take a while to find twelve Onalbi cooks."

* * *

As time went on, I cared less and less for the behavior of my own kind. Maybe I was going native. Perhaps I was trying to distance myself from the fallible human who had killed a sentient alien just because he didn't look "normal." Then again, maybe humans aren't such great company after all.

Not that I was angry with Hickok for his sarcasm. I'd gone out of my way to bait him. The reason it stung was because he had prodded my feelings of inferiority.

Still, I felt faintly soiled after his visit, so I crept out of my hut and started walking towards the guard post. I thought I could see Hresah, but couldn't be sure. The snow was falling less thickly now, but still hard enough to obscure my vision.

With no gloves, my hands quickly became numb from the cold, and climbing the last part of the wall was difficult. By the time I crawled over the rim, I was having bouts of violent shivering.

The guard post had a bit of an overhanging roof so I pressed my back against the central column and scrunched my legs in as close as I could, then wrapped myself in the blanket Hickok had brought, which I had carried lashed to my back.

"Are you well?" Hresah asked.

"Yeah, I'm fine."

"You move."

I started to correct him by saying that I was sitting still until it occurred to me that he meant the chattering of my teeth. "It's called shivering. It's a natural human reaction to cold. The muscle movement generates heat and helps to keep us warm."

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"Then you'll need more food since you are being more active. I shall send to your ship for more of your food." He lifted his secondaries and started fiddling at the side of the kiosk.

Just another example of the Onalbi seeing side effects and repercussions more quickly and completely than humans. This time, Hresah had done it with just two facts—a sort of minimalist approach that would have been frightening if I hadn't learned to trust him to be right, first time, every time. He was awfully smart for a guard.

Hresah finished his fiddling—I thought of it as typing, although it certainly wasn't a keyboard—and sent the information from the computer in the kiosk to the main one at the human camp and wherever the Onalbi did their data processing. Transcripts of everything that Hresah and I said were sent to the linguists and scientists to let them know what Hresah and I were learning about each other. Presumably, a rudimentary definition of shivering had just been entered into the Onalbi master database. More grist for the mill.

The ground underneath me was hard and cold. The metal shell of the kiosk was hard and cold. Even the air felt hard and cold. I wrapped the blanket tighter around me and tried to concentrate, but ended up just watching the snowflakes drift to the ground. Up here on the rim, there was a slight breeze. Every so often, the snow would twirl into eddies and dance in response to subtle air currents I could scarcely feel.

Hresah poked the side of the kiosk, then said, "Your people are inquiring about your health. I am told that it is not good for you to be exposed to this much cold."

"Well, it's not exactly Miami in the middle of August."

"I'm sorry. That didn't translate well. The computer thinks that you were making a comparison, but I have no referent."

I grunted. "Miami is a place on Earth where it is warm. August is the name of a time period when it is warm. To be in Miami during August means you will be warm."

"And it is not warm here, now. I understand. Do you wish to be warmer?"

I sighed. "Do I wish to be warmer? Yes. However, I wish even more to atone for killing Grenabeloso. Eventually, you will decide what to do about the situation. Then I will face whatever punishment you think is necessary with as much dignity as I can muster. I made a mistake. Now, I must accept the consequences."

He was quiet for quite some time after that. I watched the snow accumulate on the lower edge of my blanket where it stuck out from under the overhanging roof. After a while I said, "Hresah, I have been thinking about what we were saying yesterday."

"About you owning the valley?"

"Yeah. I think the best way to explain it is to start with my hut. We both feel that when I mixed the water and the grass and the dirt and sticks together to make a little adobe shelter, that I made something that is, in some sense, mine, right?"

"We have similar feelings, yes."

"OK, well, let's look at it this way.

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You Onalbi, at least as far as I can tell, are pretty solitary creatures. So far, I've never seen more than three of you together at a time, and that only happened once. The rest of the time, you guys seem to stay by yourselves, right?"

"Yes."

"Humans, on the other hand, tend to stay together. We evolved to hunt in packs against bigger, stronger animals. You have those claws and you're pretty much able to take care of yourselves, but humans have little in the way of natural weapons, so we needed to outnumber our enemies."

"You have pack hunters called hyenas, do you not? Are humans like them?"

My gut reaction was to deny it, but from his point of view, the similarities would outweigh the differences. "Uh, well, sorta. Let's say wolves instead. A comparison with a hyena is considered insulting—comparison with a wolf is less so."

"But do not hyenas laugh? Are they not—"

All I could do was laugh out loud, knowing full well that it would only reinforce Hresah's assumption . . . and that irony made it all the richer, so I laughed even harder. "Hresah, you're wonderful. I like the way your mind works. Under better circumstances, I would have liked to offer you my friendship."

"I do not understand."

"It's quite all right. Perhaps we will take the time someday to explore the differences and similarities between humans and hyenas, but it will probably be a long conversation."

"We will have that conversation. I will remind you. Let us return to humans hunting in groups."

"The critical thing here is that humans settled down. We used to be nomadic hunters. Then we started living in one place—"

"Ah! Ah! I see! When a group of humans lives in one place, then they all need mud to build huts. Mud becomes scarce. Once mud becomes scarce, then humans must leave to find more. But that goes against the human tendency to want to settle and live near other humans, so a tension is set up to be near other humans, and yet to find enough mud to build huts. This tension will express itself how . . . as hostility? Yes?"

Like I said, give an Onalbi two facts to work with and he's as good as a mind reader. "That's one possibility. They may take mud from one another by force. Another possibility is trade. Someone who lives on the edge of the valley where mud is still plentiful can trade mud for food."

"Marvelous! Ecstatic! I see it! It explains so many things. You are in competition for *resources.* Not only for mud huts, but for the mud from which to build them. By your very numbers, you make commodities scarce. The valley is yours because it is where you get your mud."

I nodded. "Now, you're on the right track. Follow that train of thought and you'll derive law and nations and war and the whole concept of advertising."

"I'm sorry, the computer doesn't know that word."

"Well, suppose you have mud and someone else does not. Advertising lets him know you have mud and

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want to sell it to him."

"I am fascinated. You and I have done more to further understanding than all other Onalbi-human contacts. This makes it all so clear. The same for food then, yes? Eat too much food in one area and it becomes scarce."

"Right. You Onalbi are nomadic. When you wander about, the food you eat, whether it's a *besa* or whatever, is only a small part of what is in that area. Then you move on. We build a town and it's not long before the food nearby gets exhausted."

"And this drove you to agriculture. So clear. Your greatest weakness is also a strength. Amazing. Then agriculture made you learn biology and forced your technological growth. Oh, this is marvelous. Tell me, you must advertise food, right?"

"Relentlessly."

"You are both strong and weak at the same time."

"And so when I saw Grenabeloso and the *besa,* I was acting like a pack hunter defending one of my own kind against a predator."

"Because the *besa* might have mud and return the favor in the future by giving you mud when you needed it."

"Right. But you could also say that I simply acted on a prejudice that anything that stood on two legs must be similar to me."

"You did not look far enough ahead."

"Right."

"And yet you can learn to look ahead. I have seen this."

"I am trying to learn to look further ahead, yes."

"Do others look ahead? Your contact group cannot be what they claim to be. Of all humans, they are the ones with the shortest sight, when they should be the ones who see furthest ahead. They do not look beyond the now. We keep waiting for the ones with the vision of the future, and yet they do not come."

"But, Hresah, they *are* the contact group."

"How can this be? They need the furthest vision, but have no idea of even tomorrow's consequences! Consequences longer down the road—they are blind to them. They are . . . I cannot say that, it is a bad thing to say even of one of my own kind, much less of a human."

Knowing full well that what Hresah and I said would make its way to the contact team, I decided to throw caution to the wind. I had empathy for the frustration that the Onalbi must feel when words were malleable depending on the needs of the moment and the shifting objectives behind the opaque eyes. "Hresah . . . I am going to say a bad thing, myself. After this, I will probably be in trouble with my own people. The contact team is made up of politicians. Does the computer know that word?"

"Elected officials who decide policy. Is that correct?"

"As far as it goes, yes, although not all politicians are elected. But here you must read between the lines. You are aware that humans have jobs. A job is a function that a human specializes in so that someone else may specialize in another task and they both become more efficient at their jobs."

"We have jobs. We have specialized

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functions. I understand."

"We get paid for our jobs. This allows us to—"

"Ah! Money! Wonderful concept. So fluid. So versatile. Our system is more like what you call barter. We are very interested in your money idea."

"And you realize politicians get paid."

"Competition for money. Yes. Splendid process. This means that your humans who have the job of politician should each strive to do the best job that they can, so that they will earn the most money, yes?"

"Well, it should work that way, but it doesn't. Instead, partly because there isn't a good way to objectively rate the job that a politician does, we get people who are not good at governing. In other words, they are not good at politics."

"But a rating system should not be the problem. You pay musicians to produce music. How well they play is subjective, yes? Yet you are able to decide who you like. On objective things, simply wait, then evaluate how their decisions worked out."

"Hmmm, this may be more difficult than I thought. Let's throw in the concept of advertising. Politicians advertise that they do a good job."

"So? This should not be a problem. It would allow you to find the politician who does the best job. Then you choose him, then he makes more money. Yes?"

Slowly, sadly, I shook my head. "Add one more thing. Humans do not always tell the truth. Since it's difficult to tell whether a politician actually does a good job, they can lie to you in their advertising. The better their advertising sounds, the more they get elected. Basically, they get elected, not on how well they govern, but on how well they lie."

It's foolish to project human emotions onto aliens, but, anthropomorphism or no, I could have sworn that Hresah was flabbergasted. He said nothing. He kept making little abortive movements as though he was about to say something, but nothing came out. While I waited for him to sort out his thoughts, I amused myself by contemplating the expressions on the faces of the contact group when they found out what I'd just done to their carefully manicured, coiffed, and pampered egos.

I wondered if I should start filling out paperwork to join Onalbi society, even if it was only until my execution. Regardless of my personal opinion of their worth as human beings, the contact group had very real power, including the ability to override the captain under certain circumstances. They could have me boiled in oil and chopped into little bite-sized pieces for the Onalbi to pick apart. To say I had just burned a few bridges was an understatement.

Finally, Hresah mastered himself. "You do not consult—" And here the computer was unable to translate the word; it passed it straight through. The word was anwabi.

"Try that one again, Hresah. It didn't come through."

After jockeying for a while, we finally had to admit defeat. It was frustrating, because Hresah clearly thought that the concept was impor-

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tant enough that it merited the effort, yet was at a loss to define something that to him seemed so obvious that he had never had to define it.

I was of little help. The cold had seeped so far into my bones that my shivering was continual. As much as I enjoyed our conversation, I had to get back to my hut and the warmth of my fire, or I would save the Onalbi the trouble of killing me.

We agreed to part. He promised to throw down more fuel for my fire.

My strength was gone, and I lost my grip going over the edge, falling down the sloping wall of the valley.

Hresah could not come to my rescue. The Onalbi cannot negotiate steep inclines. Indeed, my incarceration in what would be a high-security cell for an Onalbi was mainly symbolic; my frequent visits to the rim were proof of that.

What Hresah did do was to summon help via the kiosk. Several Onalbi showed up, but under the circumstances, mainly as observers. Fortunately, it wasn't long before humans arrived and scrambled down to where I had fetched up on a rock ledge. Hasty examination and conferring led to the conclusion that I had broken an arm, a leg, and probably a rib, plus sundry contusions, lacerations, and other indignities. I endured their poking and prodding with as much stoicism as I could. When I ran low on stoicism, I substituted groans. During the trip back to my hut, I ran out of groans and began cursing as a means of expressing my discomfort.

The doctor, a fellow named Lamon, was the practical sort. Hickok fumbled ineffectually at rekindling my fire from the coals for ten or fifteen minutes while Lamon worked on getting me patched up. After achieving a state of supreme frustration over having to share the tight quarters inside my hut with the bumbling Hickok, Lamon shooed him out and had the fire up and going in less than two minutes. He then went back to working on me, leaving Hickok outside cooling his heels, along with the rest of his body. Since I was in no mood to put up with Hickok at the moment, that raised Lamon several notches in my estimation.

He clucked and fussed over me for a while longer, then pronounced me as fit as I was going to be for a bit. He started in once, wishing that he could get me back to the medical bay on board the ship, but I told him that I'd rather be where the Onalbi put me and that I felt that the precedent was important enough that I'd chance things the way they were. He looked distinctly unhappy, but desisted.

He left me some pills to deaden the pain, then crawled out the door, promising to check in on me later in the day, and again in the morning. I thanked him just as Hickok barged in.

Hickok wasted no time on pleasantries now that Lamon was gone. "Just what did you think you were doing, Paul? Do you think that being a cook makes you more qualified to negotiate with the bugs than the contact team?"

I'd heard people refer to the Onalbi once or twice as bugs before, so I wasn't surprised to hear the term. Given his position on the contact

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team, however, I was a little surprised to hear it from *him.* "I didn't negotiate anything."

"No," he spat sarcastically, "you just did your dead level best to undermine everything we've achieved in the last three months."

"Undermine *what?* You yourself said you've gotten nowhere. Hickok, you and I—and for that matter, the Onalbi, as the recordings clearly show—are under no illusions as to how much progress you've made. Hresah as much as said that you're fools."

"*Ohhh* . . . so Hresah is qualified and authorized by the Onalbi to conduct their side of the negotiations? A *prison guard?* Well, please be so kind as to inform the rest of us once the two of you get this all figured out. We don't want all of the contact team's time to be wasted, not to mention our years of training for this very moment. This is a very delicate process, you know. What did you think you were going to accomplish as a cook? Trade recipes? How quaint!"

What I wanted more than anything in the world was to take a deep breath, but my rib precluded that. Spears of pain rewarded my attempt. I briefly considered telling Hickok to buzz off, but decided that, since it was coming sooner or later, I'd just as soon get it over with. "You can talk all you like, but you'll never get anywhere because the Onalbi have seen through you. Pretending otherwise is nothing more than ego inflation."

"What? You think the Onalbi are going to tell a mere prison guard what's going on in their negotiations with the humans? You know what, Walker? You're stupider than I thought. Hell, it's probably just a ploy on their part to flank us and see if they can get inside information on our position. And you fell for it! If that's the case, you're as good as a traitor!"

And with that, he left.

I held off as long as I could from taking a pain pill, as Lamon had told me that they'd make me drowsy and I wanted to think.

Was it possible that Hickok was right? Had I been played for a fool? Were the Onalbi just using me to get confidential information on our side of the negotiations? Once again, Hickok had deftly played on my lack of self-worth, reminding me that I was only a cook, and that I had no training for dealing with the situation.

I had rashly alienated the only humans who might be able to help me. At this point the contact team was going to do everything in their power to distance themselves from me. For all I knew, they would throw me to the Onalbi as a sacrificial offering. Effectively, I was now alone against the Onalbi . . . and against my own species.

As promised, the pills knocked me out. I had the vague impression that Lamon came in, checked me, stoked the fire and left, but was unsure whether it was real or just another dream.

Sometime late in the night, I became aware that the fire had died down to the point where I was getting cold. Some part of my mind kept telling me that I had to get up and put more wood on, but I was too tired and hurt too badly to actually follow through.

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Sometime later, I became aware that the fire was burning steadily. I remember thinking that Lamon must have dropped in again to check on me. I made a mental note to thank him, and nodded back off.

The next morning I came fully awake to a crackling fire. It was a little too big, but the excess smoke that was pooling in the ceiling didn't bother me where I lay on the floor. Clearly, Lamon had made his promised morning visit.

I enjoyed the warmth for a while, then dozed off again. Drifting in and out of sleep, I thought I heard a dry *snick, snick* sound. My first impression was that Lamon was breaking twigs to add to the fire.

Imagine my surprise, then, when what came through the door was not Lamon, but an Onalbi claw. While one of the smaller manipulating arms gently moved the door aside, the claw deposited a few branches, neatly cut to the same length, on the fire, then withdrew. This was followed by more *snicking* sounds and another deposit of wood on the fire.

Then I heard soft scratching noises as a large, bulky body moved close to the door, settling itself across the opening, effectively adding its mass to the insulating effect of the thin shield of mud-slathered branches.

"Hresah?" I called.

No answer.

"Hresah?" I called again, louder this time. My side felt as though it was going to rip open.

"Hresah," acknowledged the dry, whispery voice from outside. No translation, just his naked voice.

"Thanks," I said, knowing that without the computer in the kiosk to translate, he probably wouldn't understand.

"You are welcome," came a stronger, more mechanical voice. Clearly, he had brought some kind of smaller computer down with him.

But . . . "How did you get down here?"

"Same way we put other Onalbi in. A sling used as you would use an elevator. Another now stands at the top. He lowered me to take care of you."

"But why bother? You'll probably just kill me anyway."

At this, I heard scrabbling noises as the body at the door shifted. The door pushed aside and his large, blunt head appeared as his secondaries placed what I took to be his computer on the floor between us. "Why do you think you are to die?"

"I killed Grenabeloso."

"Do you want to die?"

"No. Believe me, I don't want to die. But I want the books to balance and if that's what it will take, then I'll have to face it. I don't want the future of our two species to have a shadow hanging over it."

"You are looking ahead."

"I'm trying to."

"That is what an anwabi does."

In spite of, or perhaps because of all the rest I'd had, my mind was cloudy. Maybe it was a side effect of the drugs. I couldn't follow what he was saying. "What is what an . . . anwabi does?" I did my best to approximate the way he pronounced it, with the accent on the middle syllable.

"It is the word we had trouble with

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yesterday before you fell. An anwabi looks ahead. It is his job, his specialization. Do you not have those whose job it is to look ahead?"

"I'm still not sure what you mean by look ahead. How could you have someone whose job is to look ahead?"

"Everything that we do has consequences, yes? Sometimes large actions have small consequences. Sometimes small actions have large consequences. It is the specialization of an anwabi to examine an action for possible consequences. Sometimes it is very difficult, as the consequences may be very far in the future and many things must be considered."

"Then I wish I'd talked to an anwabi back when I was fooling around instead of hitting the books," I muttered to myself.

Apparently, his computer's hearing was sensitive enough to pick up on that. "You have mentioned before that you wish you had not spent your youth as you did. Was there no one to tell you what would follow?"

"Sort of. It's pretty much accepted that you should do well in school, but it's like washing your hands before you eat, everyone pretty much ignores the advice."

"And there was no . . . person you could go to?"

"Person? You mean a person whose only thing to do is to tell you to study hard?"

"A person whose job is to study any question you bring and tell you what is likely to happen."

"Sounds like a fortune-teller."

"I'm sorry, the computer does not understand that."

"Let's pass on that, then. It would be a diversion. So how does an anwabi do whatever he does?"

"Let us use an example. Suppose we are to take present circumstances. We have a human. The human has killed an Onalbi. The humans and the Onalbi both wish to establish permanent communications. To be friends, perhaps. We are agreed on the conditions?"

I nodded. "That pretty well sums it up."

"Then what we do is this. We need an anwabi. There are many, but due to the complexity and the importance of the question, we need a good one, the best we can find. We, you and I, go to talk to this anwabi. We tell him the conditions I have just described. He will think about the problem in general—decide what is relevant. Then he will ask us questions."

"Questions? What kind of questions?"

"Did you kill the Onalbi as an act of war? Since it seems that humans are in competition for resources, did you kill the Onalbi for its resources? Were you defending yourself because it attacked you? Many questions."

"Sounds like a trial."

"In a way. An anwabi will want to look at the way the humans will react if one of their kind is killed. Also, how will the Onalbi feel?"

"That sounds like the kind of thing that you and I've been talking about."

"Just so. Then there are the long-term things to look at. For this, the future of our two races, we must examine things with the greatest exactitude, as the future will be with

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us, our children, and their great-grandchildren. We must provide for them all the optimal solution."

"Sounds impossible. You can't always make everybody happy."

"That is part of the anwabi job. Knowing that an anwabi has decided something makes it more palatable, even to those who must suffer."

"So an anwabi is kind of like an arbitrator between two parties?"

"He can serve that function. But he can also assume the role of investigator, and judge, and lawyer, and jury—as I understand these terms. And sometimes . . . executioner."

"That's an awful lot of power for one person to have. How do you know they'll be fair?"

"They are born to it."

"Born to it? It's a hereditary title?"

"No. They are *born* to it. Literally. Centuries of breeding. Long pedigrees. Records are kept of the decisions that anwabis make. Many years later, they are reviewed by others to determine if the anwabi's decision worked out as he foresaw. If necessary, adjustments will be made to rebalance. If an anwabi is good and has few or no decisions reversed, then he is able to mate with other chosen anwabis. Their offspring are then better anwabis. Many centuries of this have produced anwabis who can reliably work into the third generation from the present, and less reliably out to the fifth generation."

Considering the life span of an Onalbi, that was impressive. "But what about the anwabis whose decisions aren't good enough?"

"There are always smaller decisions to be made. There is plenty of work for all, for we all need to make decisions, and though the breeding for anwabi has had trickle-down effects throughout the general population—even an ordinary Onalbi can see several years into the future—there are always things where wise counsel is needed. So even a lesser anwabi does well. And if his decisions are deemed wise, he begins to advance, and his bloodlines are elevated in the breeding plan, which is in itself something that others are bred for—to oversee the breeding."

"Wait a minute, are you saying that all Onalbi are bred for their jobs?"

"Yes and no. They are bred for their jobs, but they are not required to take that job if they do not wish. If they choose another profession, they may do well, but they must be aware that they will be competing against those who *have* been bred to that job and they must do well indeed to prosper. Though we would never force an Onalbi to do a job they did not want to do, they usually will be most prosperous doing what they were born to do. Whether to follow the job one's bloodlines were blended for is a frequent question for an anwabi to answer."

My head was reeling with the implications. "But how can you select the genes for an anwabi? What makes someone able to see the future?"

"We do not know. It does not matter. We breed."

I spluttered and fumed. I had anticipated a long, complicated answer, based on intense scrutiny of the Onalbi genome. Instead, what I got was such a pragmatic, rule-of-thumb reply

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that it threw me. "But how can you know?" I persisted.

"What makes a good anwabi? Good answers. What else could possibly matter? If it would make you feel better, we regard it as a facet of intelligence. You breed for intelligence, do you not?"

I was flummoxed. "Uh, no. We don't breed for anything."

"I do not understand. Do you not breed with those who are most successful? Have I misunderstood? I thought that human women desired men who were intelligent, wealthy, and strong. Do they seek men who are foolish, poor, and weak? Do they seek men who are at the bottom of your society?"

I gave this one a few moments of thought before answering. "Put that way, then you're right. But it's not planned in a formal sense."

"Ah, good. Then you reap exactly that which you sow. Did my idiom translate well? Did it make sense? We breed for specialists and you breed for generalists. Our system yields those who are very, very good at one thing only. Your system yields those who are perhaps not quite as good at any one thing, but are more versatile. Both systems have merit. Onalbi and humans would be good partners. Our strengths and weaknesses would fit nicely, yes?"

Was it the pain pills that gave me this giddy sense of unreality? The conversation was slippery, out of control. I had the sense of things being said that I couldn't quite grasp. "Uh . . . yes. We, not just me, but all humans, I think, could use anwabis from time to time. Possibly you have other things that we need, but a good anwabi would be priceless."

"And we Onalbi find much to admire in your concepts. Your more general approach to questions has led to cross-fertilization between your sciences, and to more technology. I am telling you no secret that we have seen the results of your approach and it will give us thoughts for many years. Your concept of money as an abstract thing is something that has caused many conversations already. We must consider for some time before adopting the idea, but it has merit. I, myself, feel that it may be adopted. I will urge this."

Remembering Hickok's sarcasm, I shook my head. A prison guard urging an entire world to change . . . now, that was a laughable concept. "Hresah, how can you say such a thing? You're just a guard."

Hresah made a noise that the computer could not translate. "And what kind of job—what kind of training would produce the best prison guard?"

My brain was blank. "I don't know. Maybe a warrior."

"Would it not be efficient to have the judge as the guard? Save time, I think. Also be jury. Also be executioner, if need be."

"Sounds as though . . ." Sudden chills racked my body. "My God, *you're an anwabi!*"

He bowed his head slightly, a mannerism I had showed him on another occasion. "Hresah, at your service."

I could not think of a single intelligent thing to say. Suddenly, it all came

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into focus. The free-ranging conversations. The philosophical discussions. The probing questions. Hickok had been right, in a way. I had been played by a master. Plumbed to the depths of my soul. Used as a mirror of the human race. And found wanting, no doubt. How could a murderer give a good impression of what humans were like? All too accurately, I was afraid.

"But, Hresah, you've been here with me for months. How could you give up that much of your time? There must be other things that you should have been doing."

"What could be more important than a first meeting between races? What more important questions to settle? What greater challenge? Let others answer the ordinary questions. I would not miss this opportunity."

"But me? Why didn't you talk to the contact team? They're the ones you need to talk to."

"There are other Onalbi talking to humans. There is an anwabi among the Onalbi talking to your contact team. He looked forward to . . . let's try this word," he spoke and the computer paused briefly before translating, "relished—did that word translate properly?—he relished the opportunity to talk to your contact team. I do not think I would be exaggerating to say that he is now disappointed. I think you and I have said enough about your contact team."

"Is there an anwabi assigned to each group that's talking to humans?"

"No. Only two so far. There are not enough to go around. That is why there are no Onalbi talking to your scientists. Their anwabi is in the final stages of investigating another issue. Nothing must disturb him until he is done. Once he is free, then he will make his way here and the scientists will begin to talk."

"But can't another be found?"

"Sadly, no. There are three anwabi alive at this time whose decisions have never been reversed. It was decided that those were the ones and the only ones who might serve as anwabi concerning the humans."

"And you're one of the three?"

"You have a word, 'boast,' which I do not understand the depth of. From our conversations, I think now that it implies a certain falseness. Like a politician. If you will consider, you will realize that it would be the worst kind of foolishness for an anwabi to underestimate or overestimate his own powers. In acting capacity as anwabi, I have never had a decision altered or modified in any way. This is nothing but a fact."

"And yet you spent your time on me."

"Most fascinating problem imaginable to me. Would spend rest of my life on this problem if necessary to assure that the right thing was done. Glad to say that it will not be necessary. My decision has already been made."

Years before I had run across the phrase, "Today's as good a day to die as any." I decided that I'd rather not face those claws on my back. My struggle to get into a sitting position left me panting for breath. "I'm ready," I gasped.

"Grenabeloso's death was bad. It was brought about by ignorance and

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by prejudice. These are both bad things by themselves. Combined, they are destructive beyond the limits of either by itself. You have admitted the same to me many times. You do not contest the facts or this interpretation. Is this correct?"

I nodded weakly. "I did kill Grenabeloso. I'm not proud of it."

"You did not kill Grenabeloso as an act of war. You did not kill him for his resources. You did not kill him for any reason other than the thought that you were saving a being that you regarded as similar to yourself. That the being was a *besa,* an animal frequently used for food, was unknown to you then, but understood by you now. Is this correct?"

I nodded again. "Right."

"Now, I will tell you something that you did not know. Grenabeloso was an anwabi, a well-regarded one."

My stomach sank into the ground. Now, I was in for it. "You're right," I whispered, "I didn't know that."

"I will now tell you another thing. There is a provision in Onalbi law that restitution may be made by fulfilling the obligations of the one killed. I am considering extending this provision to cover the current unusual circumstances. Do you wish to assume Grenabeloso's position as anwabi?"

Reality lurched. Hresah might let me live? "How can I? I wasn't bred to it."

"The same way Onalbi do when they take a job outside their bloodlines. You have consulted with an anwabi, who is myself, and have demonstrated some ability to look ahead. It is my consideration that humans would do well to begin breeding their own anwabi. You will make mistakes, your children will make mistakes, but fewer. Your grandchildren, hopefully, will make fewer still. How can you object? You have said yourself that humans need anwabi."

"But I killed Grenabeloso! How can a bad human anwabi make up for killing a good Onalbi anwabi?"

There was a lengthy pause, during which I imagined Hresah searching for words. "We are on unsafe footing, here. We are at the mercy of the translations provided by the computer. Let us hope that they carry the proper flavors. Your words were that you would be a bad human anwabi. Now, consider. Does the word bad refer to the word human, or to the word anwabi? It is to be expected that you would be an imperfect anwabi, even with help. The very concept is new to you, although you have shown more aptitude for the work than any of the members of your contact team. But as for you as a bad human being . . . this is a cultural thing. I am forced to try to understand you within the framework of your own culture, and a fascinating problem it is. In our favor is the fact that we seem to be able to reach similar, if not identical, conclusions on issues of morality and ethics. Killing is bad. Life is good. Producing things is an admirable trait. The gulf is not so wide as to be unbridgeable. I have been studying this problem for the last few months. I do not see that you are a bad person. The worst that I see is that you reach conclusions too quickly, without weighing enough evidence or considering consequences. This, however, is the same thing that

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happens with beginning anwabis. We must give ourselves time to learn. I believe that it will best serve our two races for you to live. You humans will need an anwabi for your contact team. You will be that anwabi. You are more long-sighted than they are, and we will conduct talks with you. You and I will review decisions together. You will learn to be an anwabi. As a side benefit, I will get to study interesting human topics, like owning this valley. That I must ponder more to get the full depth of it."

"So you're saying that you're not going to kill me?"

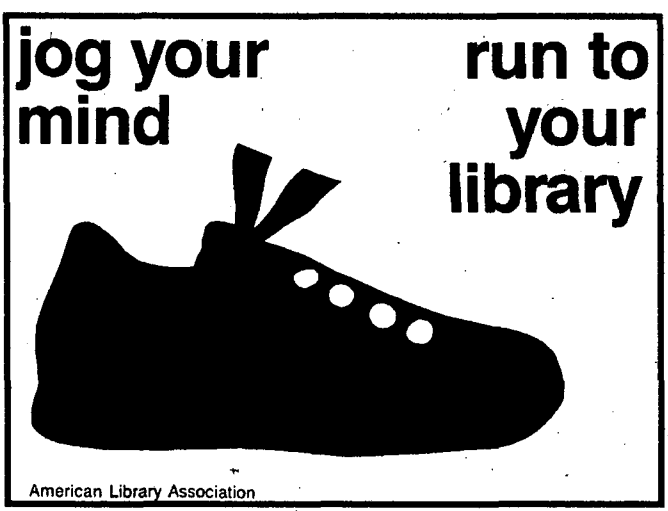
"Had you understood the situation, yet killed Grenabeloso, I would have killed you long ago. I must make allowances for your different understanding of the situation, though. That, and the fact that you show promise as a beginning anwabi."

I did not trust myself to speak. My life was being handed back to me. I had grown so accustomed to the idea that I would be executed that I had closed down my vision of the future. Now, unexpectedly, I had a future again—a blank slate. What would I do with it?

I steadied myself against the wall of my hut. "Hresah, if you think that I can atone for killing Grenabeloso by attempting to be an anwabi, then I will accept your judgment. I would like to thank you for sparing my life."

Hresah laid his claw alongside my thigh. "You once said to me that under other circumstances you would like to offer me your friendship. Perhaps someday you will make the offer again. You will find that I will offer you mine in return."

Sudden sharp pains lanced my side as I attempted to laugh. "And don't forget . . . we still have to talk about humans and hyenas. . . ." ■



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Amy Bechtel

NO MORE TO THE DANCE

We'd all like to solve our problems—but sometimes the trade-offs make it hard to know what is a solution.

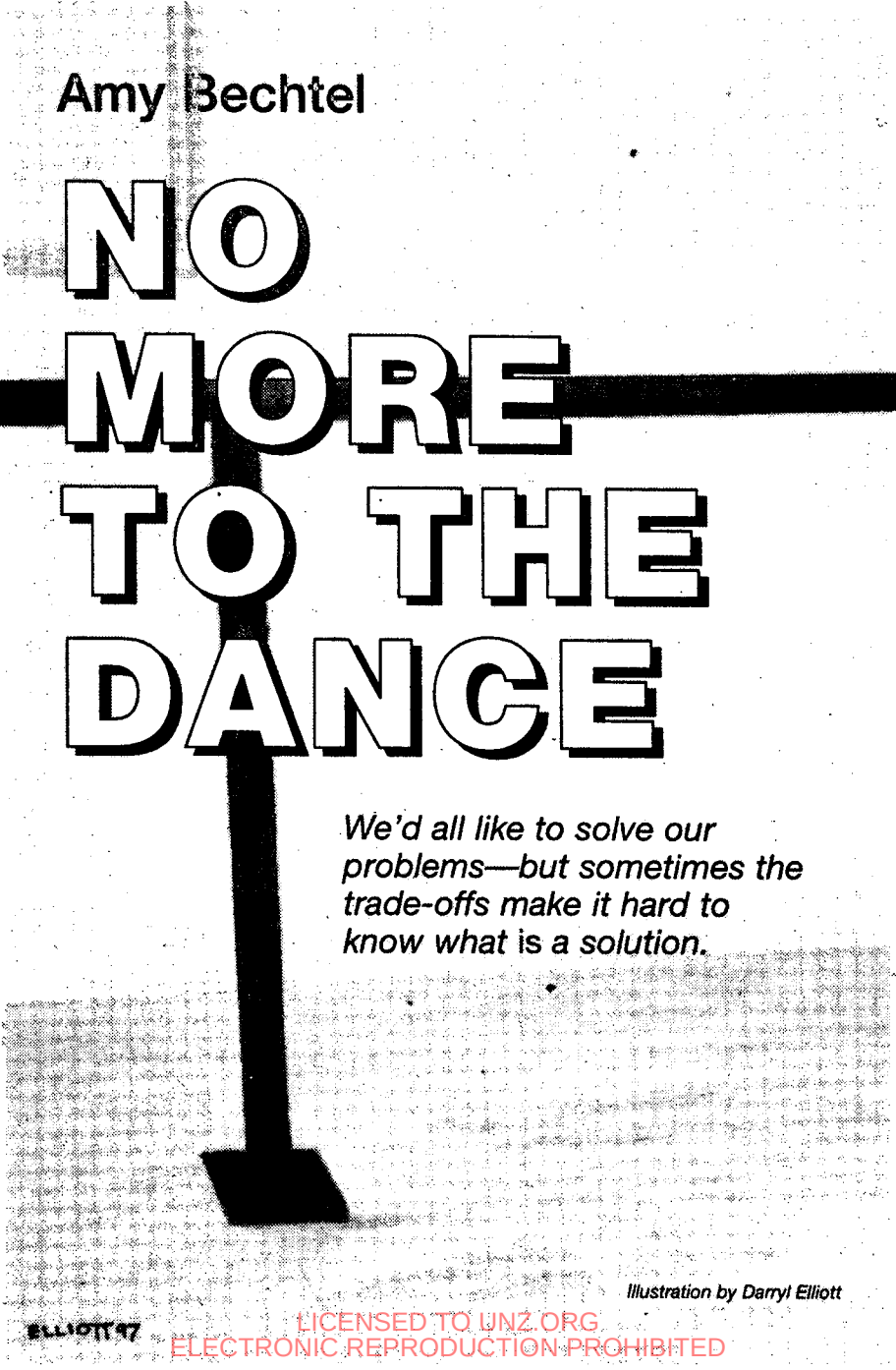

Illustration by Darryl Elliott

ELLIOTT 97

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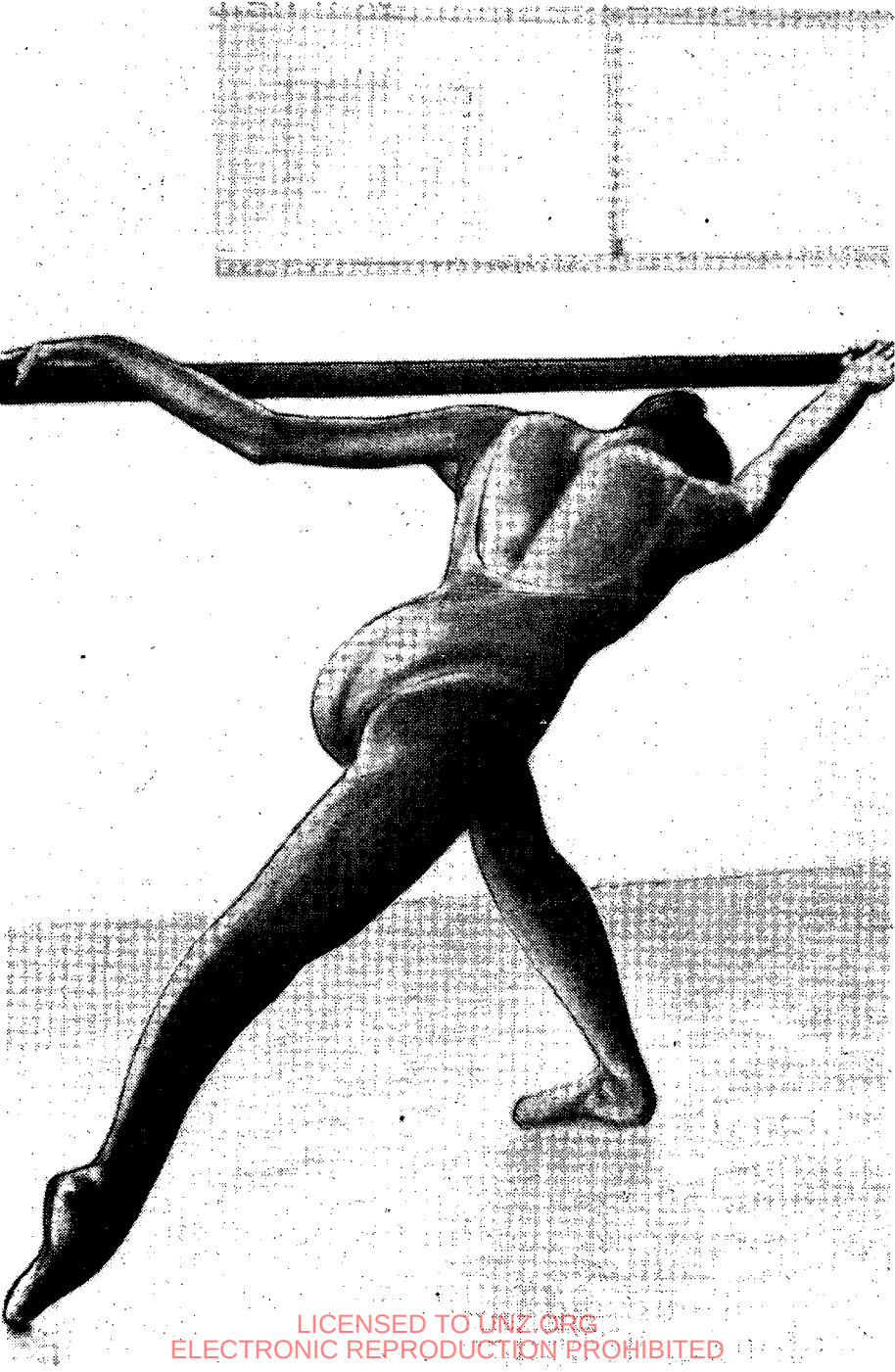

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Lilly Cordova caused quite a stir when she first joined our ballet class. It was no fault of her own, even though she arrived late and we were already warming up with pliés; she slipped in silently, dropped an apologetic curtsey to the teacher, and found a place at the barre. But when our pianist looked up and saw her, his jaw dropped and he played a full eight counts in the wrong key. If he'd been playing something less cumbersome than a piano, he would certainly have dropped it on his foot. My brother Johnny's a musical wonder, to be sure, but he's far too easily distracted by a pretty face.

And Lilly was a beauty, no doubt about it. Glossy black hair tied back in a short ponytail, liquid dark brown eyes with great long lashes, a perfect dancer's body—slender and delicate in leotard and tights. Johnny recovered fairly quickly, considering, and had only a few more musical lapses during the rest of the class. Most of the girls found his mistakes entertaining (although Marianne, the teacher, did not). *I* tried to pretend that I didn't hear the mistakes, that I wasn't Johnny's sister, and that I hadn't recommended him for this job. I don't suppose I was markedly successful.

No matter what Johnny played or what he flubbed, Lilly danced flawlessly. She never seemed to notice his mistakes. After I had watched her at the barre for ten minutes, I was already wondering what she was doing in this class. It was the studio's advanced class, and all of us had been dancing on pointe for some time, but there were no future ballerinas among us. This was a quiet little class, catering mainly to students from the nearby university, along with a few kids and a few working women like me. Most of us just danced for fun and exercise, and none of us were particularly skilled. But Lilly was. Every move, every step at the barre was performed with incredible precision. On the floor her skill was just as great. As I watched her I began to realize that she reminded me of someone, perhaps of one of the great ballerinas of the past. There was something in her look, in the way she moved. But I could not place the resemblance.

In the dressing room after class Lilly accepted the other girls' admiring comments with polite courtesy, but with no enthusiasm. She didn't laugh or smile. It didn't occur to me to wonder about that. After all, she was new here, and perhaps she was shy. And I was in a terrible hurry to get changed into street clothes; I wanted to hustle Johnny out of the studio before Marianne decided to fire him.

Johnny was waiting for me outside the dressing room door, still looking rather starry-eyed. I took him by the arm and drew him outside into the parking lot. "I can't believe I talked Marianne into hiring you," I said. "She's going to kill me."

"Mmm," Johnny said. "OK."

"What do you mean, OK? After she kills me she'll fire you, and then how will you pay your share of the rent?"

"She won't fire me, Heather," Johnny said confidently. "I'm the best pianist she's got."

I gave him a look.

"Usually," Johnny amended. He

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climbed into the passenger seat of my battered old Rabbit, and I gave a sigh and got in behind the wheel. I had just put the car into reverse when Johnny grabbed my arm.

"Wait," he said. "It's Lilly."

"Oh, Johnny."

"I just want to see what kind of car she drives. Wait just a minute."

Johnny watched breathlessly as Lilly unlocked the door of a white Oldsmobile and slipped inside. As she backed out of her space, Lilly's headlights illuminated the interior of the Rabbit. Then they swept past and all we could see of her car was a pair of red taillights. Johnny sighed and said, "I wonder where she lives."

"We're *not* following her home."

"Why not? I'm in love."

"You're not in love. You're in lust."

"OK, so I'm in lust. She's beautiful."

"She is, isn't she?" I pulled out of the parking lot, noticing with some chagrin that we were, at this moment, following Lilly's car. Oh well, surely she would make a turnoff soon. "You know, Johnny, she reminds me of someone. A dancer I've seen on video. But I can't think who it is. Does she seem familiar to you?"

"Mmm. I feel like I've known her all my life."

"I mean, does she *remind* you of someone."

"Remind me of who?"

"Oh, never mind. Maybe it's just because she's such a good dancer. I can't imagine why she isn't with a company. She must be nineteen or twenty; it seems like she should be out making a name for herself. *I* would, if I had that kind of talent."

Which I didn't, to be sure. I grew up loving music and dance, but having precious little talent for either. Apparently Johnny got all the family's genes for music, for when he's not distracted by a pretty girl he's a musical genius. Last time I counted he had mastered seven different instruments, and he composes as well. For myself, I can't play a note on any instrument known to man, and though I love ballet I'm hopelessly clumsy at it.

In front of us, Lilly's car slowed and signaled a right turn. "Where's she going?" Johnny asked in surprise. "That's a dead end, isn't it?"

"Yes, I think it is." I slowed down as I approached the turnoff, wondering if Lilly was lost. After all, she was new in town. But she wasn't driving hesitantly, like a lost person would. Instead she was building up speed. But there was no road where she was going, nothing but a dark empty lot full of trees.

A splintering crash split the night, and Johnny cried out. For an instant I froze at the wheel, in shock, then my foot found the gas pedal and I drove as fast as I dared to the road's end.

"There she is," Johnny whispered. "Christ! At least it doesn't look as bad as it sounded." He jumped out of the Rabbit, and I threw it into park and followed.

Lilly was already out of her car, standing in front of it in the headlight beams to examine the damage. Dust drifted around her, settling slowly toward the ground. The front bumper was bent askew, and the hood was thoroughly dented, but I didn't see any further damage. The tree she had

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hit was still standing. Lilly was running her hands along the bumper when we came panting up.

"Lilly! Are you OK?" Johnny asked anxiously.

"I'm fine," she said. "I thought I'd feel something more." She touched the dent in the hood, shrugged, and got in behind the wheel. Johnny caught the driver's door before she could close it, and I knelt in the dirt and touched her shoulder.

"Lilly, are you sure you're all right?"

"Of course." She looked at me in some confusion. "Who are you?"

"I'm Heather Munro. We were just in class together. This is my brother Johnny."

"Oh yes. The pianist."

There was a vague, unfocused look about Lilly, and I wondered if she had struck her head without realizing it. Or perhaps she was in some sort of shock. "We can take you to the hospital," I said. "Maybe you should get checked."

"No, thank you. I'm fine; I'll just go home."

"Let us at least give you a ride. You shouldn't drive any more tonight."

"I don't want to leave the car here."

"Johnny can drive it for you. Come on. Please."

Lilly argued but I was adamant; there was no way I was going to let her drive. In the end she got into the Rabbit with me while Johnny checked her car, pronounced it reasonably safe to drive, and maneuvered it back to the main road. He pulled out behind me, and Lilly twisted in her seat to look at her car. Then she settled into the passenger seat and gave me directions to the Broadmoor Motel.

I knew the way to the motel quite well; it was across from the hospital, where I worked. "Have you been in town long?" I asked.

"No. I just got here."

"Are you visiting someone?"

"Not really. I'm here with my mother. She's consulting with some of the doctors at the University Hospital."

"Oh, I'm sorry. I hope it's not serious."

She shrugged. "It's been going on a long time. There's a research program here for multiple sclerosis, an experimental treatment. That's what she's here for."

I nodded; I knew about it. In particular I knew one of the research assistants, a young doctor named Tyler Mackenzie, whom I had admired from afar for months.

"So what happened with the car?" I asked. "Did you lose control?"

Lilly shook her head.

"Then what happened?"

"I wanted to feel it," she explained, "but there wasn't anything to it, really. I thought it would be more exciting."

"Exciting?" I said blankly.

She shrugged.

"Lilly, are you *sure* you're OK?"

"Oh yes," she said, a little sadly. "I'm fine. Really."

When we got to the Broadmoor Johnny and I walked Lilly to her motel room; I was still worried that she might have some kind of head injury, and I wanted to make sure that someone was there to look after her. Lilly found her key, opened the door, and awkwardly invited us to come in.

In the room a woman was sitting at

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the table with a book in front of her; she looked up when we entered, and seemed startled to see us. But she could not have been half as surprised as I was.

And I knew why Lilly had reminded me of one of the great ballerinas. The woman at the table was wearing a red blouse and a black skirt, and for an instant I pictured her on stage, in a red costume with black sequins sparkling in the lights, a brilliant smile on her face as she danced. I blinked, and the image was gone, but I knew who she was: Vanessa Ahrensen, one of the most brilliant dancers to ever grace the stage.

I realized that I was staring at her almost as blatantly as Johnny had gazed at Lilly during class; quickly I looked away.

Lilly said, "Mother, this is Heather. And Johnny. They gave me a ride home from class."

"A ride? Lilly, is something wrong with your car?"

"Not really. Just a few dents."

"She, ah, hit a tree," I put in. "Her car seems OK except for the body work, but we didn't think she ought to drive home."

Vanessa winced, but said no more about the car. She thanked us for helping her daughter. I suggested that she keep a close eye on Lilly tonight, and we said good-bye. In a daze I followed Johnny out into the parking lot.

"Do you think she'll be all right?" Johnny asked.

"What?"

"Lilly. Will she be OK?"

"Oh, yes. I think she'll be fine. Johnny, can you believe it? Her mother is *Vanessa Ahrensen.*"

"What about it?"

"You play piano for the ballet and you don't know her name? Hurry up; I'll show you when we get home."

Back at our apartment I dug out one of my videos of Vanessa Ahrensen and popped it in the VCR. "Look at her," I whispered to Johnny, and turned up the sound. Vanessa appeared on stage, in a flowing white dance dress, with flowers in her hair. She seemed to float across the stage, to fly into the air. Johnny watched intently, taking in her charisma and magnetism, her style and verve.

"She's extraordinary," Johnny murmured.

"Yes. She is."

We watched her dance through half the tape, then Johnny sat down on the couch beside me, picked up the remote, and pushed the mute button. On the screen, Vanessa went on dancing, in silence.

"What are you doing?" I asked.

"Look."

I looked. Vanessa spun in a pirouette, leaped in grand jeté, held a long beautiful pose in arabesque. I shook my head, not understanding what Johnny wanted me to see.

"When you watch her dance," Johnny said, "you can see the music. She's part of it."

He turned the sound back on, then off again, and suddenly I understood what he meant. The music was still there, in every move and pose. Music in motion.

"Does she still dance?" Johnny asked.

"No. She hasn't for years. She's got

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multiple sclerosis; she can't even walk any more."

Johnny was silent for a long time. Then he said, "I can't imagine what that would be like. Suppose I could never play an instrument again? I think I'd go mad."

"I know."

We stayed up together and watched the video to the end, and then we played all the other videos I had of Vanessa's dancing, and when I finally got to sleep that night, the dance went on in my dreams.

The next morning at work I felt like the walking dead. I don't function at all well on two hours of sleep. I stumbled through my rounds, drawing blood samples from one patient after another, thankful that I was skilled enough to hit veins even when half asleep. I've been drawing blood for two years now and I'm good at it; I usually find the vein first try even on the most difficult patients. But it's rather a thankless job. People seem to find phlebotomists even more terrifying than dentists.

Finally I came to the last patient on the morning list. I checked my list against the card on the door, noted the match, and only then recognized the name. Inside the room, Vanessa Ahrensen was waiting for me.

She sat by the window in a sporty motorized wheelchair, looking out at the lawns and parking lots below. When she heard me knock she turned and smiled.

"Why, hello," she said. "Heather, isn't it? Don't tell me you're one of the vampires."

I set down my tray of collection tubes on the bedside table. "I'm afraid so. Sorry."

"I'm grateful for what you did for Lilly last night."

"Is she all right?"

"Yes, she's fine. A few bruises, that's all. I'm glad you were there to help her."

I said, "I'm glad we happened to be there. It was such a freak accident."

Vanessa frowned slightly, and held out her arm for me. I was suddenly nervous—I had never before drawn blood from someone I idolized—and I sighed with relief when I saw her veins, lying along her arm in a beautifully visible pattern. The tourniquet lifted the vein I wanted nicely, and I slipped the needle in with ease in spite of the attack of nerves. The first Vacutainer tube began to fill with blood.

"Lilly seems to think of you as a friend." Vanessa said suddenly.

"Well, yes. I suppose so." I switched tubes and started filling the second one.

"I think I should tell you something about her, then."

"Tell me what?"

"To start with, what happened last night wasn't an accident. She did it deliberately."

I glanced up at Vanessa's face, thoroughly confused. I said, "Surely you don't mean she ran into a tree on *purpose.*"

Vanessa shrugged. "She's done such things before."

"But why—" I broke off, remembering the odd look on Lilly's face, and her words, *I thought it would be more exciting.*

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"If you watch her dance for long enough," Vanessa said, "you'll see it. What she lacks."

The second tube was full of blood. I switched to the third one, thinking of what I'd seen of Lilly's dancing. The uncanny precision, the way she danced through Johnny's musical mistakes without even noticing.

"You mean musicality," I said hesitantly.

"More than that. Passion, joy, excitement . . . these are things she doesn't feel. She doesn't understand music. All her dance is done to a count inside her head. When she was little her doctors thought she had autism. Then they watched her move and dance, and they said well, perhaps not autism, but something like it. They criticized me, you know, for pushing her into dance, but I did not push. She asked for classes when she was five." Vanessa paused, looking down at her arm as I switched to the fourth tube. "Good heavens, how much blood are you going to take?"

"One more tube, I'm afraid. They've ordered quite a lot of tests."

"I must tell Dr. Peterson that his cure will do me no good if I die of anemia. He keeps telling me that he must monitor my blood for evidence of side effects from the treatment. I should think he would also be concerned about the side effects of all this blood loss."

I managed an awkward smile, and filled the last tube in troubled silence.

"Lilly has never found it easy to have friends, you know," Vanessa said, flexing her arm as I racked the tubes. "I tell you all this so you will understand if she seems distant, or remote. Or if she does strange things, in her struggle to feel what others do." She touched the arm of her wheelchair, moved to the window, and glanced back at me.

"Thank you for telling me," I said quietly.

She nodded stiffly, and turned away.

When I finished my shift that evening I went nervously looking for Tyler Mackenzie. I'd never gone looking for him before; we'd only talked on the occasions that we had passed in the hall. I found him alone in the M.S. lab, intent on a computer screen. I stood in the doorway for a moment, hesitant. I didn't want to interrupt him in the middle of something important. I was about to slip away quietly when he pushed his chair back from the screen, noticed me, and smiled.

"Hi, Heather."

"Hi. How's it going?"

"Oh, pretty well. What's up with you?"

"I just wanted to ask you something. About the M.S. treatment."

He looked surprised. "What about it?"

I knew a fair bit about it already; I had studied up on it when I'd noticed that Tyler was on the project. It was gene therapy, complicated by the fact that M.S. was caused by a combination of factors; there were two abnormal genes involved, plus a retrovirus, all working together to trick the body into attacking its own myelin sheaths. The goal of the current treatment was to stop the disease in its tracks, to pre-

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vent symptoms from growing worse with time. Not a cure, as such, but a great improvement over chronic progression.

"How effective is the treatment?" I asked.

Tyler hesitated. "It's been difficult to prove," he said. "M.S. treatments have always been hard to evaluate because the symptoms fluctuate so much in the normal course of the disease. Symptoms appear and disappear all the time. But the double-blind tests were promising. Extremely promising, in fact. That's how we got the approval for this project."

"What about the patients you're treating now?"

"It's too early to tell; we've only just started the treatments. But we're very excited. It's quite possible we may be able to stop the progress of the disease entirely."

"What about reversing it? Will you be able to actually cure it some day?"

"Well, not yet. We've got some good theories on inducing remyelination but so far they're not working out in practice. But someday . . ." He grinned. "Maybe I'll get the Nobel prize for that. Someday."

That grin transformed his face, making him look suddenly young and happy and carefree, and for a dazzled moment I completely forgot what we were talking about. But then I remembered to ask about Lilly; I wanted to know if she was at risk for M.S.

"She's more at risk than the general public," Tyler said. "The disease does run in families, of course. And it doesn't usually manifest itself until people are young adults."

"Could it ever cause something like autism?"

Tyler frowned. "I don't think so. Of course, we don't know what causes autism, but I've never heard of any kind of connection with multiple sclerosis. M.S. can affect the brain, the optic nerve and the speech centers, and occasionally it affects the emotions, but in the opposite way; emotions become much more labile and intense." He stared at me suddenly. "Why in the world are you asking?"

"I know Lilly. She's, well, a friend. And there's something odd about her. About her emotions."

"How old did you say she is? Nineteen?"

"Yes."

"You think she's autistic?"

"No. But something's wrong with her, and Vanessa said Lilly's doctors have never been able to figure out what."

"Maybe I could meet her sometime," Tyler said. "I doubt I'd figure anything out, but who knows?"

I felt a shiver of excitement; this was the perfect opportunity to ask Tyler out, with the convenient excuse of having him meet Lilly. I groped for words, but nothing would come. When the silence between us became awkward, I said lamely, "Well. Thanks for the info. Bye."

"Bye," Tyler said absently, and went back to his work.

I walked out of the lab and into the bustling hall, feeling frustrated, and stupid, and very much alone.

I got home late that evening, cranky and tired, and found Johnny in

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front of the mirror, checking his reflection from every angle.

"What do you think?" he asked me. "Do I look OK?"

"Of course," I told him, surprised; Johnny is not usually one to stare into mirrors. Anyway he always looks good, even at his scruffiest, and tonight he was dressed in a good shirt and new jeans, his long hair neatly tied back in a tail. "Why?" I asked him. "Do you have a date?"

He smiled happily. "You bet. I asked Lilly to come down to the cafe tonight to listen to us play."

"You asked Lilly out?"

"Sure did."

"And she's coming?" I said doubtfully.

"Well, yes, of course. Say, you're coming to see us tonight too, aren't you?"

"Oh, Johnny. I was going to, but I'm just so tired."

"Tyler's coming," Johnny said.

"*Tyler?*"

"Well, I know you like him. And I bumped into him last week while I was waiting for you to get off work, so I asked him to drop by the cafe tonight to hear our music."

I stared at Johnny.

"So you're coming?" he asked.

I nodded silently. Then I gave Johnny a push out of the way, and claimed the mirror for myself.

Sad to say, the mirror didn't help much. Johnny has all the good looks in the family, too, and it didn't help that I ended up sitting at the cafe table next to the stunning Lilly. But Tyler was kind; though he did a double take when he saw Lilly, he sat down next to me. I introduced them, they said hello, and we turned our attention to the corner where Johnny and his band were setting up. It was almost eight o'clock.

Johnny joined us at our table, bright and happy, and sat beside Lilly and talked softly to her for a moment; I couldn't hear what was said, and was a bit embarrassed when I realized that I was straining to eavesdrop. I was feeling some turmoil; should I tell Johnny what Vanessa had told me? Or should I stay quiet, and let things happen as they would? Troubled, I watched as Johnny slipped away from the table and returned to his group. Tyler leaned close to me and said, "Hey, Heather, what kind of band is this?"

He was gesturing at the band's more unusual instruments. Johnny had his hammered dulcimer out, and Richard and Mary had a mandolin and a twelve-string guitar, while Gillian had the weird percussion and Jody her fiddle. I named off the instruments to Tyler.

He said, "What's that thing that looks like a mixing bowl?"

"Ah, well. It's a mixing bowl. Part full of water. It has some interesting tonal qualities." I decided not to get into Gillian's various strings of keys, all of which chimed with different tones; Johnny's percussionist is talented but admittedly bizarre.

"This is Johnny's weirdest group, but it's his favorite," I told Tyler and Lilly. "His rock and jazz groups just play covers at clubs, but Johnny writes a lot of the music for this bunch. It's my favorite too."

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"Huh," Tyler said. "I'm a rock and roll man myself. So, Lilly, what kind of music do you like best?"

Lilly hesitated. Then she put on a smile, and said, "Oh, I'm interested in most all types of music."

Then the lights went down.

There were not many people in the cafe, but when the music started everyone looked up from their steaming mugs and plates of food, and listened. Some, caught by surprise, were spellbound. Others turned back to their food or their conversations, but glanced toward the musicians occasionally, and took some time to listen. I was as rapt as anyone, caught up in the spell of the music. The candles on the tables flickered, the strings of keys chimed, the fiddle and dulcimer sang together. My favorite song was one of Johnny's compositions, a duet sung by Johnny and Mary, accompanied only by Gillian's whispery chiming percussion. I glanced at my companions in the middle of the song. Tyler was mesmerized. And Lilly was bewildered.

In the glow of candlelight I could see the concentration on Lilly's face as she struggled to comprehend. I saw her darting little glances at the other audience members, noting their reactions. She glanced at me, and I hastily looked back at the band. When the number was over she smiled and applauded, but her expression and movements looked forced, as if she were following a script. Johnny caught her eye, flashed a smile at her, and started the next song. And Lilly gazed at him as he played, in a kind of puzzled wonder.

* * *

When the concert was over I let Johnny have the car, to drive Lilly home, and walked outside with Tyler. The parking lot was dark, and deserted except for the cafe's patrons, all of whom were now leaving. A cold wind blew past, fluttering the LIVE MUSIC banner on the cafe's window. My Rabbit rattled out of the lot and onto the street, carrying Johnny and Lilly and an assortment of instruments.

"She looks like her mother," Tyler said out of nowhere.

"You mean Lilly."

"Yes, of course. And I do see something odd about her, though she hides it well. I doubt most people would notice."

"But you did."

He shrugged. "My sister's autistic. There's something about Lilly that reminds me of her, but it's very subtle."

"Her mother told me that Lilly was diagnosed as autistic when she was little, but the doctors kept changing their minds."

"There're a lot of different degrees of autism. Some people are completely lost in their own worlds. But others function perfectly well in society. Like Diana, my sister. She gets along pretty well."

"Lilly dances. Ballet. Beautifully."

"Well, that wouldn't fit with autism. But something similar, perhaps. Hmmm."

"Do you think I should tell Johnny?"

"Lord, Heather, I don't know. He's your brother, you should know best about that. Anyway, what makes you think he doesn't know already?"

I stared at him; I had not even con-

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sidered that possibility. But Johnny was more observant than I was. He probably did know.

"Your brother's quite a musician," Tyler said. "Is he older or younger?"

"Younger. My parents' problem child. You should have seen the look on my mother's face when she visited us last year and found that his hair was longer than mine."

Tyler laughed. "I can imagine."

"My parents were so glad when he came to town and moved in with me. They were sure I'd be a good influence, and I'd convince him to change his ways. I've never had the heart to tell them that it's not going to happen. I do envy Johnny sometimes, you know. I wish I could have some of his musical ability, some of his carefree attitude."

"I don't know," Tyler said. "I think you do all right with what you have."

"Thanks." I knew I was blushing, but it was probably too dark for him to tell. "How old is your sister?"

"Fifteen. She's still in high school. She lives with my folks back in Colorado. I don't see them much. Actually I haven't seen much of anyone since I started work with Dr. Peterson. The work takes so much time, and you always feel like you should be working faster, harder. Especially when you start meeting patients, like Vanessa."

"I see what you mean. But surely it's good to get out of the lab once in a while. A change of pace, a fresh start."

"Maybe so." Tyler shivered and stuck his hands in the pockets of his jacket. "So, can I drive you home, since your brother's run off with your car?"

"You sure can," I said happily, and he opened the door of his car for me.

I was still awake when Johnny got in that night. I had no business being awake, since I'd been up almost the whole night before, but I couldn't stop thinking about Tyler. Anyway, I had tomorrow off, and could sleep all day if need be.

I heard Johnny come in, heard various bangings and bumpings as he got his instruments through the door and into his room. Then I heard the rustling of papers for a time. Perhaps Johnny was looking for a particular piece of music, or perhaps he was changing the pictures on his work wall. Yesterday all the pictures had been waterfalls. Johnny uses pictures to compose his music. Don't ask me how. He says he reads them like a music score, and plays what he sees, but it's never been something I've understood.

After a time I heard the soft notes of a flute. The music was simple and spare, in a minor key. Each phrase of the song seemed to reach for something, sad and longing, never finding what it sought. Usually music can put me to sleep, which is a useful thing when you live with a nocturnal musician. But this music was disturbing, and though the flute was soft and low the music was no lullaby. I got up and went to Johnny's room.

He didn't know I was there at first. He was sitting cross-legged on the foot of his bed, flute in hand, a rumpled notation book in his lap. Every so often he paused in his playing to scribble on the book in his lap. Each phrase he played was different, but it

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was all part of the same song. I stood in the doorway for a long time, watching and listening, and Johnny played the last phrase, made his last notation, and put down pencil and flute. He was deep in thought, as quiet and pensive as I had ever seen him. He looked up then, and saw me.

"Heather, what're you doing up? I thought you always slept through this stuff."

"I do. Just not tonight. I haven't gone to sleep yet. And that music . . . what are you playing?"

I looked at his wall. The waterfalls were still in the places where they had been earlier, but this music had not sounded in the least like a waterfall.

"It's not on the wall," Johnny said. "Just a picture in my mind. Lilly."

"Oh." And I understood why the music was so sad, so full of longing; why it seemed to be missing something. And I knew that Tyler was right; Johnny already knew everything we knew about Lilly.

"She can't feel things, Heather. She wants to; she sees others doing it, but she can't."

"I know."

"But maybe I can help her."

"Johnny, she's been searching all her life, and a lot of people have tried to help."

"Yeah. But I'm the one falling in love."

"In love? But Lilly can't feel love, can she?"

"Most people can, but they don't. Lilly can't, but she tries. She looks for it, even if she'll never find it. That makes her special. Don't you see?"

It was Johnny's typical convoluted logic, but I did see what he meant. Somehow Lilly had touched him, deeper, I thought, than any girl ever had before. But this relationship was hopeless from the start, and it made me sad, and tired. I gave Johnny a hug, and went to bed.

During the next week I didn't see much of Tyler, but I dropped by the lab occasionally, and once he came and said hello while I was on duty, and he always seemed glad to see me. So I was happy enough. And Johnny saw Lilly almost every day. He took her to the mountains and to the zoo, to rock concerts and to symphony orchestras. He took her to music stores where she could sample a hundred different types of music; he took her to movies and candlelit dinners, and when she asked him to, he took her to bed.

The next morning, when I was getting ready for work, I saw Johnny sitting disconsolately on our little sofa, staring into space. I rubbed my eyes and looked again; he was still there, and he was awake. Johnny is never awake in the morning.

"Johnny? You OK?"

He glanced up, and shook his head. I sat down beside him and said, "It's Lilly, isn't it."

"Yeah." He looked down at the sofa and tore a piece of worn thread out of the fabric. "We slept together last night. She asked me to. She'd seen it on movies and TV, listened to people talk; she thought it would make the difference. And so did I, you know?"

"And it didn't make a difference?"

"No. 'Course not. I took her home

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just before dawn, and I started crying on the way, and she touched my face and looked at me, and she didn't know why I was sad. Nothing's changed for her. Maybe it can't change."

"I don't think it can, Johnny."

"Doesn't matter, though. I still love her."

"I know."

I sighed and got up from the sofa; I was going to be late for work. "Come on, Johnny, go to bed. You have to play for ballet class tonight, remember?"

"Oh, Heather. I don't want to."

"Well, you have to. You're behind on your share of the rent. Way behind, I might add."

"All right," he said listlessly. "I'll go."

It wasn't easy, but I got Johnny out of the house and into the ballet studio that night. He sat at the piano, uncommonly morose, as the girls entered the studio and started to warm up. When Lilly came in, he caught her eye and his face lit up with happiness. She looked back at him, gave him an acknowledging, automatic smile, and went to the barre. Poor Johnny. It was going to be hard for him.

The class began, and though Johnny's playing lacked his usual energy and vigor, he made no mistakes that I could hear. We warmed up with barre exercises and then moved out to the floor.

We started out diagonally across the floor; one by one, chaînés turns on pointe. Lilly was first in line. She sprang up onto pointe and started across the floor in precise half circles, legs and back perfectly straight, arms graceful and controlled. I watched her enviously; I was terrible at chaînés turns. I saw Johnny glance up at her, over the piano, and his music suddenly became stronger, more compelling. The tempo changed subtly, and Lilly hesitated fractionally, almost visibly adjusting the count in her head, and then danced on. Johnny was trying to touch her through the music, but it wasn't going to work. It hurt to watch, but I couldn't stop looking. And then Lilly faltered.

She lost her balance, wobbled a bit trying to regain it, and fell off pointe halfway across the floor. There was an audible gasp from the other girls. This happened to everyone else, especially me, but not to Lilly. Never Lilly. She never stumbled or fell. But there she was, in the middle of the floor, gathering herself to start the turns again. She made it almost to the opposite corner before losing her balance again and coming to a stop. The music stumbled with her, and Johnny called out anxiously, "Lilly, are you OK?"

"I'm fine," she said. "My legs are just tired." She curtseyed apologetically to Marianne and crossed to the opposite corner for the next set of turns. Nonplussed, Johnny returned to the piano, and class went on. Lilly's turns on the opposite diagonal were as flawless as usual, and so was her dancing for the rest of the class, but when we walked out of the studio she looked tired, which wasn't at all usual for her.

"Do you feel OK?" I asked her. The cool night air of the parking lot felt wonderful on my face, but Lilly still looked strained.

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"I don't know," she said. "My legs do seem tired."

"There's the flu going around," Johnny said. "Maybe you're coming down with something."

"I don't know," Lilly said again, looking puzzled, and abruptly she fell to her knees in the gravel. Startled, Johnny caught her arm and helped her to her feet, and she stood for a moment brushing dirt and bits of rock off her legs. I touched her face; there was no fever that I could detect, but without doubt something was quite wrong with her. We refused to let her drive. Johnny took her home in the Rabbit, and I followed, driving Lilly's Oldsmobile.

Lilly's car smelled new. I touched the passenger seat as I drove; it was spotless. There was no trash on the floor, no papers strewn on the back seat, nothing hanging from the mirror or stuffed in the glove box. It occurred to me, as I drove, that the car was as perfect, and as sterile, as Lilly's dancing. As Lilly was herself.

Lilly felt fine the next day, but the day after her symptoms returned, and Vanessa brought her to the hospital. I drew blood for a multitude of tests, but the bloodwork revealed no abnormalities. The MRI and the genetic tests held the answer; Lilly carried both of the defective genes for M.S., and her MRI showed distinct plaques of demyelination in the spinal cord and brain stem.

When my shift was over I went to visit her. I found her sitting in a chair by the bed, leafing idly through a magazine.

"Hi, Lilly," I said. "How are you feeling?"

"Fine, thank you. My legs just get tired now and then. I suppose after a while I'll have to stop dancing."

I looked down at the floor. "I'm sorry."

"Oh, I don't mind. I don't really get anything out of dance, even after all this time."

"Why do you dance, then?"

"Because of Mother."

"Because she wanted you to dance?"

"No, no. Because of what dancing gave her. What it still gives her. There's this look she gets on her face when she just thinks about dancing; it's joy, I guess. I wanted to know what that felt like. I thought if I practiced hard enough, or for a long enough time, I'd find out. You know."

"Yes. But it didn't happen?"

"Oh no. But I got used to dancing. It's comfortable, I suppose. A routine."

I didn't know what to say. Lilly turned her head slightly, to glance out the window, and I was struck by her expression; her face was serene, untroubled. The prospect of giving up dance, of living with a potentially crippling disease . . . it didn't trouble her at all. I wondered if that was something to be grateful for.

On my way out through the halls that night I ran into Tyler. Literally. I was walking along staring at the floor and wondering how I might react to such a diagnosis (not well, I was sure) when Tyler came around a corner with an armload of papers. We collided, but fortunately he was able to hold on to the papers.

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"Sorry," I said. "I wasn't looking where I was going."

"Me either. Well, no harm done. Are you off for the night?"

"Yes."

"Good, good. I'm headed home myself. It's been quite a day."

"Yes, it has. Well . . . good night."

"Good night, Heather. See you later."

He was off then, down the hall to the doctors' parking lot, and I was left alone with all the things I could have said. Such as *Would you like to come over? I'll make dinner* or *Johnny's playing at the cafe on Friday; want to come?* or *Can I interest you in a movie?* But, I told myself, the time wasn't right. He had all those papers with him; he would probably be up half the night working on them. Another time would, no doubt, be better.

I was almost to the parking-lot door when it opened and Johnny came in with a blast of cold air. He was windblown and out of breath. "Heather!" he said. "Glad I caught you. Can you give me a lift home after I've seen Lilly?"

"Sure," I said, "but visiting hours are over."

"I know. I couldn't get a lift from Charlie's; I had to walk. It's freezing out there."

"Charlie's? You came all the way from Charlie's?" It was five miles, at least.

"Yeah. Come with me, OK? You can show me the best way to sneak in."

"Johnny—"

"Please?"

I groaned, and gave in.

When we slipped into Lilly's room she was sitting up in bed with her magazine. Johnny crossed the room, sat on the edge of her bed, and took her hands.

"How are you doing?" he asked.

"I'm OK."

"Good."

He reached inside his jacket and pulled out a single yellow rose. "For you," he said, handing it to her. She took it hesitantly, looking at it as if she had never seen a rose before. "I've got to go now," Johnny said, "before Heather drags me out. It's past visiting hours and you need your rest. But I want you to know I'm thinking about you. I'll see you tomorrow, OK?"

She nodded. He kissed her gently and turned to go. As we slipped out the door I glanced back at her. She held the rose in one hand, gazing at it, and lifted her other hand to her face, lightly pressing her fingers to her lips. Then the door fell closed behind us, and I followed Johnny out into the hall.

"That was a very pretty rose," I told Johnny. "Ah, where exactly did you get it, between here and Charlie's?"

"It was a big bush," Johnny said. "There's lots more roses on it."

"As I thought."

"It's just not fair."

"What's not fair? Privately owned rosebushes?"

"Lilly. I mean, her dancing ability is really all she had. Now she doesn't even have that any more."

"I know. I was just thinking, at least none of this upsets *her.* She doesn't really care. But there's something awful about that, too."

He nodded sadly, and I put an arm around his shoulders, and walked him out to the car.

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* * *

Over the next few weeks Vanessa continued her treatments, and began a campaign to get Lilly admitted to the experimental program. The red tape was phenomenal, but Vanessa was wealthy and influential, and she had funded a great deal of the research herself. Even so, Tyler thought her chances of getting Lilly admitted were poor. "It was hard enough for us to get Vanessa in," he said, "and Lilly's much younger and much less ill. She won't be considered a good candidate for something experimental."

I thought that seemed strange, since they were trying to stop the course of the disease, not cure it. Surely the ideal time to do the treatment would be early on, when the symptoms were still mild. Tyler shrugged and agreed, but said that red tape was red tape.

Time passed, and Lilly returned to her routine. She went to class as usual, but her dancing had lost its perfection. Often she grew tired, or stumbled, or lost her balance, and after a few falls she stopped wearing her pointe shoes. Soft shoes were safer. Of course none of this seemed to bother her, but it was distressing to me. And to Johnny.

When I left dance class with Johnny and Lilly on the night before Thanksgiving, it was snowing. There was no wind to speak of, and the snowflakes drifted slowly down to land on our hair and coats.

"Oh great!" Johnny said happily. "Snow. I love snow."

"That's because you don't have a car," I said, looking at the Rabbit to see how much snow I was going to have to scrape off.

"Oh, come on, Heather, it's barely even freezing. The roads are clear; there's no ice. It's beautiful."

"Hmph. If you like it so much, *you* scrape the snow off the car."

"It is beautiful," Lilly said.

I looked at her in surprise; she sounded as if she meant it. She gazed up for a moment, watching the snowflakes spin down out of the clouds. Then she said, "I'm going to start the treatments. Mother got me into the program."

"Oh, Lilly! That's wonderful," I said. "When do you start?"

"Next week. After the holiday."

"That's good." Johnny took her hand. "Really good."

I said, "I wonder how she swung that! I never thought she'd get through all that red tape so fast. Your mother's really something, Lilly. Is she going to come for Thanksgiving dinner?"

"Yes. We'll be there at six. Thank you for asking us."

"Don't thank me; Johnny's doing the cooking."

"And it will be excellent," Johnny said. "Lilly, where's your snow scraper?"

I ended up scraping the snow off the Rabbit after all, while Johnny attended solicitously to Lilly's car. We were both wet and shivering as we drove out of the parking lot. Johnny brushed snow out of his hair and rubbed his hands in front of the Rabbit's heater. The heat didn't seem to be working very well.

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"So what are we having for Thanksgiving?" I asked.

Johnny shrugged. "Don't know. Let's stop by the store on the way home."

"OK. It's nice that Vanessa's coming, isn't it?"

"Yeah, it is. And Lilly. Listen, Heather, why don't you invite Tyler?"

My heart jumped a little; I had thought of it as soon as I'd found out Tyler was staying in town for the holiday. "I don't know," I said. "I'm not sure he'd want to come."

"Then ask him, and find *out* if he wants to come."

"I just don't know if he's really interested in me. He hasn't called or anything in a long time."

"You haven't called him either, and I know *you're* interested," Johnny said reasonably. "Come on, be spontaneous. Invite him. Meet him at the door in a glamorous dress, with a flower in your hair."

For a moment I fantasized doing just that. In the back of my closet was an elegant violet silk dress that my mother had given me. I could wear that, and when Tyler came I could—

I returned to reality in a rush, and navigated an icy patch of road. "I couldn't do that," I said.

"Why not?" Johnny asked.

"I just couldn't. He couldn't possibly be interested in me, anyway. He'd probably think I was crazy if I threw myself at him like that."

"Oh, Heather. I think maybe he'd like it."

"I think maybe he wouldn't. I can't, Johnny. I just can't."

Johnny sighed, and remained thoughtfully silent for the rest of the drive to the store.

Thanksgiving dinner was interesting. Johnny had gone for the semi-traditional effect, which this year meant that there were bits of smoked turkey in the cheese-and-mushroom omelets. Vanessa raised her eyebrows when her dinner was set before her, and Lilly looked surprised, but they both appreciatively cleared their plates. After the omelets Johnny served hot tea and cookies. I was warming my hands on my teacup, wondering where Tyler was right now and what he was doing, when Vanessa asked Johnny to play for her.

"Sure," Johnny said. "What do you want to hear?"

"Oh, I don't know. Something you love to play. Anything."

Johnny disappeared into his room for a moment, and emerged with a guitar in one hand and a flute in the other. He played a few pieces on the guitar at first, then switched to the flute. Vanessa listened with rapture.

Johnny launched into a set of dance tunes, and after a moment Vanessa closed her eyes and began to sway to the music. It hurt to watch her, sitting there in her chair, when she so obviously longed to be dancing. I tried to imagine how Vanessa would dance to this music if she could, what steps she might use, how she would look dancing here in my very own apartment. I could almost see her.

I *could* see her.

I blinked and turned to face her. She was still sitting in her chair, but she was motionless now, her hand pressed tightly to her mouth. She was

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staring not at Johnny, but at Lilly, who was no longer at the table.

Lilly was dancing.

And I had never seen her dance like this before. For a stunned, confused moment, I could not figure out what was different. Then I saw it. Lilly's face was alive with expression. Her body moved with the music, from her toes to her fingertips, as if she were a part of it. I stole a glance at Johnny; he was trembling and he looked like he was about to drop the flute, but he somehow managed to play on without missing a note. Lilly lifted her arms, looking up exultantly, and spun across the tiny floor.

In the middle of a turn, Lilly's legs buckled and she fell. The music halted just as abruptly; Johnny *had* dropped the flute. It hit the floor with a silvery metallic clank, then bounced twice and rolled into a corner. Johnny knelt on the floor in front of Lilly, and helped her up.

"Oh, Johnny, I felt that," she said in amazement. "I really felt it; I understood it. I really did! Oh—" She fell against him, tumbling to her knees before Johnny caught her and lifted her back up. "My legs have gone very strange."

"Can you stand?" Johnny asked anxiously.

"No, I don't think so."

Johnny helped her to a chair and she sank into it gratefully. Vanessa wheeled quickly to her side, her look of wonder changing instantly to alarm.

"Lilly, your legs. How do they feel?"

"It's strange. Weak, and kind of numb. I suppose it's just the M.S. getting worse." Suddenly she looked frightened. "It *is* getting worse, isn't it? It's happening so fast. I didn't think it would happen so fast."

Vanessa took her hands. "It does seem fast, I know. But you'll start treatments next week, and they'll help, I just know they will. They have for me; I've had no progression at all since starting them. And they should work even better for you."

"I'm *frightened*."

Vanessa sat for a moment, mouth open, as if she had no idea what to do. And how would she know? Had her child ever been frightened before? Finally, hesitantly, she reached out and took Lilly in her arms.

On the Saturday after Thanksgiving, Tyler was at work in the M.S. lab, setting everything up for Lilly's first treatment on Monday. I peeked in through the doorway; no one else was there. I took a deep breath and went in.

"Heather," Tyler said. He looked surprised to see me.

"Hi. Can I talk to you for a minute?"

"Sure."

"It's about Lilly. She's had some really dramatic changes."

He frowned. "The symptoms are that much worse? What's happened?"

"The symptoms are worse, I suppose, but that's not what I meant. She's started *feeling* things. On Thanksgiving she was listening to Johnny play his flute, and all of a sudden she could feel the music. She understood it. And she was frightened about having M.S. She wasn't frightened before, you know."

"I know," he said softly. "Is this still going on?"

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"Yes. Sometimes it's more intense than others, but ever since then, yes."

"And the M.S. symptoms?"

"Her legs seem worse. But that kind of comes and goes, too."

"And she's *never* had feelings like this before."

"No. Never."

Tyler sat silently for a time, staring blankly at his computer screen. Then he shook his head slowly. "It's one hell of a coincidence, isn't it."

"That's what I thought."

He said, "Lord knows it probably is a coincidence. They do happen. All the time. But I wonder . . . you know, she does have brain stem lesions."

I looked at him in confusion. He caught my look and explained, "A few patients with brain stem attacks have emotional lability. The slightest thing can make them laugh or cry; the feelings are so strong that they're literally overwhelming. I've got one patient who has to take tranquilizers and antidepressants just to function."

"Then the M.S. might be what's giving Lilly these feelings."

"It's possible." He stared at me for a moment, then shook his head. "But there's no way to know for sure."

"Oh."

"But whatever the cause, it's such a marvelous thing for her, to be able to *feel*, after all this time!"

"Yes. You should have seen her listening to Johnny's music."

"Must have been great."

"Yes."

The door flew open abruptly and Dr. Peterson hurried in with an armload of folders. He nodded to Tyler, dumped his folders on another desk, and sat down with a sigh.

"Excuse me a minute," Tyler said. "I've got to ask Dr. Peterson something, and it's best to catch him before he gets buried in his papers."

"Sure," I said. He crossed to Dr. Peterson's desk and I bit my lip; as soon as he got back I could say *We're taking Lilly to the cafe tonight, and Johnny's playing. Why don't you come?* But then I remembered how he'd looked at me when I'd come in. Surprised to see me. Startled, really. Perhaps it would be better to leave well enough alone. After all, here I was, poorly educated, no artistic talent, plodding along in a dead-end job with no ambitions for anything else. What research physician in his right mind would be interested?

So when Tyler returned, I thanked him politely for the information, and walked away.

At the cafe that night I sat with Lilly in the candlelight, listening to Johnny and his band. They played exceptionally well that night, inspired, no doubt, by Lilly. She sat perched on the edge of her chair, her face rapt, leaning forward as if to capture every nuance of the music. Johnny never took his eyes off her, and I knew he played and sang for her alone.

At the end of the first set the band took a break, drifting out into the audience for drinks and conversation, and Johnny went straight to Lilly.

"Will you show me the instruments?" Lilly asked, and Johnny took her by the hand, leading her from fiddle to dulcimer to percussion. She touched Gillian's keys experimentally,

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setting off a rippling chime, and peered curiously at the mixing bowl. She played a few notes on the dulcimer, and laughed in delight. Johnny smiled at her in a way that I had never seen before, a dizzying, breathtaking smile, and took her in his arms. She held on to him tightly, holding on, I knew, to someone she suddenly and unexpectedly loved. It was a beautiful sight, really. But painful for me. *If only someone would smile at me like that. If only someone would hold me like that.*

On Monday morning Lilly went to the hospital, leaning on a cane, and politely refused treatment. Vanessa and Dr. Peterson were utterly shocked; Tyler was not. I wasn't surprised either, though neither Tyler nor I had talked to her about our speculations. She had obviously speculated a bit herself.

After a brief and emotional argument, Vanessa wheeled off in tears, and Dr. Peterson shrugged and philosophically returned to his office. Lilly turned to Tyler, looking troubled. "You understand, don't you?" she asked.

"Yes."

"I didn't decide this lightly. I'm frightened of the disease, of how fast it's progressing. But I just can't take any chance of losing this, this . . . *feeling*."

"You must understand that you may lose it anyway. There's no way of knowing for sure it's the M.S. that's causing it, or if it will last."

"I know. I've thought about all that. It's frightening." She shivered, then shook it off, and smiled. "But I'll take every minute of it that I can get. I feel alive now, like I never did before."

"I know." Tyler smiled back. "I can see it."

I could see it too, ever so clearly. *She can't feel love*, Johnny had said, *but she tries*. And now that she *could* feel, she was alive with feeling, glowing with it. Unlike so many others. *Most people can feel it*, Johnny had continued, *but they don't.*

They just don't.

Tyler and Lilly were talking animatedly. I slipped out of the room and walked away, alone in the crowded corridors of the hospital. ■

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The Dazzle of Day, Molly Gloss, TOR, $21.95, 255 pp. (ISBN: 0-312-86336-5).
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Final Diagnosis, James White, TOR, $22.95, 284 pp. (ISBN: 0-312-86148-6).
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The Ecolitan Enigma, L. E. Modesitt, Jr., TOR, $23.95, 383 pp. (ISBN: 0-312-86339-X).
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Postmodern War, Chris Hables Gray, Guilford Press, $23.95, 305 + xiv pp. + index (ISBN: 1-57230-160-0).
Fantasy Annual, Spring 1997, Philip Harbottle and Sean Wallace, eds., Cosmos Literary Agency (32 Tynedale Ave., Wallsend, Tyne and Wear, England; 415 Merriman Road, Akron, OH 44303), $8 (US), £5 (UK), 92 pp.

We just can't get away from the doom-'n'-gloom SF. We've had runs of cometary impacts, Greenhouse-Effect floods and super-'canes, ozone holes, new diseases, and more. The British have even made a tradition of trashing the planet, just so they could watch the survivors struggle to out-stiff each other's upper lips.

Not so many years ago, it was all after-the-war stuff, but the Cold War is over and everyone seems to agree that global nuclear war is no longer plausible enough for SF. And if you ask, "Since when is plausibility a requirement?" I must say it isn't, not really. But out-and-out implausibility does tend not to be accepted very well. Or maybe I should just say that story gimmicks can be fashionable.

What's the current fad? Well, a lot

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of SF attention does seem to be going to overpopulation, resource exhaustion, environmental despoliation, and a future when human civilization and even survival face a very difficult passage. Just two months ago, I reviewed Bill Barton's and Michael Capobianco's *Alpha Centauri*. In June there were Mike Moscoe's *First Dawn* and Esther Friesner's *The Sword of Mary* (sequel to *The Psalms of Herod*).

Now here's Molly Gloss's **The Dazzle of Day**. The basic situation is quite familiar—world, hell, handbasket. Add to this the popularity of O'Neill-type habitats among "sects of the counterculture—Carsonites and bird-watchers and Rodale farmers, Quakers and Mennonites—who understood" what it means to maintain a closed ecosystem, and here are the Quakers of Costa Rica leaving home, moving to a contained world, mounting vast sails, and embarking upon the seas of interstellar space as once their ancestors embarked upon the Atlantic, seeking a new home.

This is not a tale of conventional adventure. There are no aliens, no wars, no pirates, not even any real opposition from the Powers That Be on Earth, nor rebellions by disaffected minorities aboard the ship. Such things are not Gloss's point. She has prepared for us a demonstration of how people live when they are devoted to cooperation, to accommodation. To make it work, she has restricted the problems her Quakers must face to the interpersonal, the psychological. Though the ship deteriorates over the decades of the voyage, it does not fail. The world they find is cold and barren, but it is suitable for humans if they are willing to accommodate themselves to it. And if a lander must crash, half its crew is still able to return.

It's a tale of people, not things, disasters, or monsters. As such, it is really saying that if we lived more like this here, at home, our problems too would be smaller, more manageable, and we would not face the prospect of disaster. Unfortunately, this means that Gloss's tale is inescapably quiet, calm, unexciting. If you are very people-oriented, you may love it. If you are not, you may find it terminally boring.

And if you're picky about technical details . . . I read bound galleys, so these may have been fixed by the time the book hit the stores, but wine is fermented, not distilled, and one refers to the plane of the ecliptic, not the plane of the elliptic.

Science fiction writers have long loved to play the game of super-heroes. Some have even gone to work for the comic book folks. Some played Wild Cards. Some just went to war. And some—like Steven Gould (*Jumper* and *Wildside*) have played it a little straighter. Now we can add Brenda W. Clough to that last group. Her **How Like a God** gives family man and computer programmer Rob Lewis the ability to make people do (and see) what he thinks they should. It's a neat trick, similar to what Joe Haldeman did in *Tool of the Trade* (reviewed here in February 1989), perfect for reforming panhandlers and criminals, stopping muggers, getting folks to cooperate. But his wife gets

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stars and stripes in her eyes and says, "You could be President!" And their eighteen-month-old twins start acting much too mature.

Naturally enough, Rob is terrified. He tells his wife, "Don't worry about me; I'm off on a trip," and he's outta there. Gone, hiding from his novel power in the gutter, doing a lot of reading and discovering in the classic *Epic of Gilgamesh* some very familiar notes, and eventually deciding that he really does have to get a grip on it. Fortunately, he's actually a pretty responsible fellow, he makes friends easily, and he has a contact, a very nice NIH microbiologist, who is willing to help. Together they play games in Atlantic City and when Rob discovers a mental signpost pointing toward an archeological site in the Kyzylkum Desert on the Uzbekistan-Kazakhstan border, they go there.

The answer to Rob's problem turns out to have some very ancient, very long-lived roots. It's also quite modern, rooted in the realization that we all have demons within us that must be tamed before we can truly settle down to civilized family life.

How Like a God is flawed for me mostly by the difficulty I had in believing Rob's sudden leap into the gutter. Once past that, Clough held me all the way and let me down with a nice sense of satisfaction.

The latest in James White's long-popular Sector General series is **Final Diagnosis**. The setting is once more that grand interstellar, multispecies hospital where medical mysteries are solved, and this time the mystery is quite a puzzler. Earth human Patient Hewlitt, classification DBDG, has a history of reacting violently to even small doses of medication, including vaccines. Since the medics on Earth can't help, it's off with him to Sector General, even if he is pretty xenophobic.

He gets over the xenophobia soon enough as he grows accustomed to the other patients on the ward, not to mention the staff. And as he is grilled over and over about his history, the clues emerge, beginning with his childhood, playing among war ruins, climbing a high tree to eat an exceedingly toxic fruit, falling into a ravine, and awakening without a bruise. I immediately suspected a symbiote, but the cover blurb insists—and White keeps repeating like a mantra—that infections cannot pass from one world's biota to another, so it couldn't possibly be that, could it?

Well, the experienced reader knows that repeated assurances that the answer to a mystery couldn't possibly be such and such often mean precisely the opposite. *Final Diagnosis* is thus a bit predictable, but it's still a pleasure to follow White from clue to clue, past one or two red herrings, in an ambiance of civilized cooperation quite unlike what we see in most SF.

Unfortunately, the answer to the mystery didn't convince me. I won't spill the beans, but I will say it pretty thoroughly contradicts what we know about the biological requirements for organized behavior and intelligence, among other things.

In *Dreamships* (reviewed here in October 1992), Melissa Scott consid-

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ered what it takes for an artificial intelligence to be a person. Her candidate was Manfred, a competent, skilled problem-solver, a software "construct" designed to guide starships through hyperspace, and her conclusion was that competence alone was not enough. If all you do is fulfill your designer's aims, you are not a person.

Dreaming Metal returns to the same industrial desert world, where people live in caverns, a terrorist group pushes for increased rights for the "coolies," indentured laborers shipped from another world, and mightily resists any hint that machines might be given more rights than real people. *Dreamships*'s protagonist, Reverdy Jian, is here with a new construct, but she doesn't like it (it reminds her far too much of Manfred) and is eager to trade it for a replacement. Here too is the stage illusionist Celinde Fortune, who has just designed a new robot (karakuri)-based illusion and needs a new construct to operate it. Jian gets rid of hers; Fortune finds it, hooks it to a second construct to get a package with all the features she wants, and finds she has . . .

What? You can see it coming, of course. The new construct is as skilled a problem-solver as ever Manfred was. But it is also something more, which becomes abundantly clear when it encounters its first music-synthesizer and asks, "Please—can I play it?"

In other words, here is a construct capable of devising its own aims. A person. And it has appeared in a very volatile situation, with all the potential for uproar of proving to the Irish that Saint Patrick was really a Protestant.

And if you wish to know how sneaky an author can be, consider this: Fortune names the new construct Celeste, ostensibly after her late Siamese-twin sister. But a celesta is a musical instrument with machine-industrial affinities (it uses hammers on metal plates). And one of Fortune's illusions uses an industrial press for making metal plates.

Obviously, there's something here for the literary analysts to play with. But there's also plenty for the ordinary reader. Scott is definitely one of modern SF's true dreamers.

A decade ago, L.E. Modesitt, Jr., sent Nathaniel Firstborne Whaler, professor of the Ecolitan Institute, off as *The Ecologic Envoy* to negotiate a trade agreement with the Earth-based Empire and reinforce the Institute's reputation—gained centuries before, when it trashed Earth's ecology—for brutally effective action.

Now we get to see Whaler in action once more, with the true love he gained last time out, the lovely Empire Intelligence agent, Sylvia Ferro-Maine, now by his side. The Institute has been asked to do an economic infrastructure analysis of Artos, a recently terraformed world, and the Institute's Prime has picked Whaler, told him to read up on what his long-gone namesake did to Earth (see *The Ecologic Secession*, reviewed here in November 1990) and to make appropriate plans, based on use of the Institute's full credit line, and sent them off to confront **The Ecolitan Enigma**.

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They have hardly arrived on Artos before they must face their first assassination attempt. Soon thereafter, it is clear that Artos is the center of a web of intrigue designed to set the galaxy in flames and that Whaler must act as drastically as his ancient namesake. With cleverness, forethought, and a few distractions born of the need to negotiate his relationship with Sylvia, he survives and succeeds, and the reader winds up feeling both quite satisfied and a bit more aware of the essential links between ecology and economics.

What is the Ecolitan Enigma? It's "a puzzle," says Whaler. "If we wait [to act] until what we do is obvious and justified, then far more people are hurt, but we can claim justification. Or we can do what needs to be done as soon as possible." What people call "moral" action tends to be comfortably after the emergency has peaked. The Ecolitans act on principle; they believe in preventive surgery, indeed in the preemptive, surgical strike. And when they act, the problem is ended. Indeed, even the bystanders are left a bit twitchy with shock, with the side-benefit that the Ecolitans really don't have to get drastic very often. The applications to our own history are obvious, though we don't seem to have any group willing to pose as Ecolitans. Maybe they are simply waiting in the wings of history.

It is perhaps worth noting that whalers are fond of striking deep and fast with their harpoons, that pioneer economist Adam Smith called the guiding spirit of economic activity the "invisible hand," and that Sylvia's surname translates roughly as "iron hand." Economics and ecology, says Modesitt, have little-recognized but very potent effects on political behavior.

Writers often seem to do very different sorts of work when they write alone and with collaborators. Together Jerry Pournelle and Larry Niven have generated some rousing, action-packed stories. Think of *Footfall,* the Motie tales, and *The Legacy of Heorot* and *Beowulf's Children* (with Steven Barnes). By himself, Niven is perhaps cleverer and more thoughtful; he's hardly lacking in action, but the flavor of his Known Space tales (e.g., *The Ringworld Throne*) is quite different.

I was thus intrigued when I found **Destiny's Road** in the mailbox. It's set in the same future as *Legacy of Heorot* and *Beowulf's Children,* it refers to the Avalon expedition as the failed first of Earth's efforts to colonize the stars, and it examines the results of the second such effort (it says there was a third, but that's all it says; perhaps there will be another book). And if there are no monsters to fight, there is certainly a problem.

The setting is the island called Crab, long and twisty and marked by the Road, a ribbon of lava produced when the lander *Cavorite* used its fusion flame to burn off the local vegetation and clear the way for Earthlife, which can feed the colonists. Alas, the local soil lacks potassium, and human life is possible only because merchant caravans come up the Road from elsewhere, bearing the "speckles" without which people lose their intelligence.

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One end of the Road is a spiral; here is Spiral Town, where Jemmy Bloocher kills a merchant in a tavern and must flee. Down the Road he goes, to discover other communities with different customs, learn to surf, join a caravan and learn a bit about the importance of outbreeding, discover that his world harbors an aquatic sentient species, learn that the caravans go to the mainland but people from the Crab are shot if found over there, and . . .

Suffice it to say that in time Jemmy does indeed make it to the mainland and learns where speckles come from. His life seems to follow a spiral pattern, round and round with each turn taking a bit longer. He goes a little crazy for awhile, discovers how deep runs the human urge to explore and how uniquely human it may be, and grows up. Eventually he takes steps to reform the essential dynamic of what historians call a "hydraulic civilization." Niven is too much the realist to attempt to show us any overnight utopia, but his ending is quite satisfying. The tale's spiral path is straightening, and there are hints of where it may go from here.

It is worth noting that there is a parallel to what Jemmy does that is going on in our world right now. Governments have long struggled to control access to information. "Freedom of the press" is a very recent invention. And now that we have PCs and the Internet, control is practically impossible. Perhaps the inventors of the Net should receive a "Jemmy Award."

When **Political Science Fiction**, edited by SF-academic Donald M. Hassler (who edits the Science Fiction Research Association's journal, *Extrapolation*) and government professor Clyde Wilcox, showed up in the mail, I thought it looked quite interesting. After all, as Frederik Pohl says in Chapter 1, "The Politics of Prophecy," there is very little SF without a political element. Unfortunately, once Pohl is done with his chapter, there is really very little of substance left to say, except to point to various stories as examples of assorted poli-sci ideas.

This seems natural enough. Precious few SF writers are philosophers or political scientists (more are scientists). The political ideas in their stories come from their readings, perhaps from college courses, or are created by opposition to whatever the writer wishes to critique, and are often rather superficial. Some writers are capable of more, but the political/literary analysts represented in this book seem unable to deal with that; one searches the index in vain for any mention of—for instance—Cordwainer Smith (Paul Linebarger), C.J. Cherryh, Mack Reynolds, or David Gerrold. *Star Trek*, on the other hand, receives much more than its share of attention.

There are also a number of very basic errors that lead me to suspect that the book's editors actually have very little respect for SF. In his chapter, Wilcox says that Orson Scott Card's buggers (in the Ender Wiggin series) can have no government because one queen dominates the hive and there are no individuals, quite neglecting the fact that the buggers have multi-

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ple queens and hives, and hence individuals. Two pages later, he tells us that Ursula K. Le Guin's galactic government was called the "Ebunen," rather than the "Ekumen."

It doesn't take many such things to diminish a book's credibility.

Writer's Digest's series of science guides for SF writers, edited by Ben Bova, has just grown by two. Electrical engineer, professor, and SF writer Paul J. Nahin has put together **Time Travel: A Writer's Guide to the Real Science of Plausible Time Travel**, covering some of the history of the notion in SF and out of it, a bit of the philosophy governing the infamous pair o' doxies of time travel (with apologies to Grendel Briarton), and the various schemes modern physics and cosmology suggest may actually permit us to travel in time.

It's a very nice summary of the subject, but it really shouldn't be marketed just to writers. I can easily see it being used in a high school physics class, with the frequent mention of SF stories helping to make the physics and math involved very accessible.

Much the same can be said of **Space Travel: A Writer's Guide to the Science of Interplanetary and Interstellar Travel**, brought to us by Ben Bova himself, with Anthony R. Lewis. Here too we have an excellent survey of rocketry basics, space conditions, industries, and habitats, the Moon, Solar System, and universe, relevant international treaties, military uses, and more. A very nice introduction to astronomy for either writers or beginning students.

If you wish to know what may happen to war in the future—or one man's take on that topic—get a copy of Chris Hables Gray's **Postmodern War**. He has endeavored to study the impacts of the media, computerization, artificial intelligence, and our culture's love affair with technology on the practice of war both today and tomorrow. He seems to have a very jaundiced view of the human animal, for he insists that the old view of war as an extension of politics must be reversed: we are not political creatures, but warring ones, and everything we do is directed toward that one end. To defeat war, we must therefore defeat politics, at least as it has long been linked to war. Only then can we have peace. "War is very strong. We must be stronger."

That's a nice wish, but on the way to it he seemed to me to get thoroughly lost in the swamps of "high theory" rhetoric. He would have served me better—and, I think, himself—if he had chosen to speak as plainly as, say, Ben Bova.

If you remember fondly the Good Old Stuff from the 1950s and earlier, you may well wish to lay hands upon the Spring 1997 issue of **Fantasy Annual**. Editors Philip Harbottle and Sean Wallace offer a 1939 John Russell Fearn tale, "Invaders from Time," a graphic version of Fearn's 1939 "Thoughts that Kill," three new shorts, including an old E.C. Tubb revised for the occasion ("Time and Again"), and four articles concerning

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the collecting of early American SF paperbacks, the British *Scoop* (the first SF newspaper), Australian fantasy, and the infamous Vargo Statten.

I found the stories valuable mostly for what they say about how far SF has come. The articles were more interesting, and I expect fans with an interest in the history of the field will agree. □

IN TIMES TO COME

Our December issue leads off with a George Krauter cover for G. David Nordley's novelette "Crossing Chao Meng Fu." One thing our ventures into space have given us is an awareness that the Solar System isn't what it used to be—or, more accurately, what we used to think it was. It's proved full of surprises, including a Mercury where this gripping tale of "crossing the frozen wastes" might actually be possible.

Appropriate to the season, we also have a Christmas story—with the unlikely (but apt) title "Easter Egg Hunt." It's by Jeffery D. Kooistra, and the title will make sense when you read it!

Mark S. Lesney's science fact article on "Biology at the Extremes" brings us an update on just how wide a range of conditions can support life, and what that might imply for the future. Finally, of course, we'll have the conclusion of Frederik Pohl's novel *O Pioneer!*

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BRASS TACKS

Dear Dr. Schmidt:

This is concerning Ben Bova's article, "The New Era—Part II" (February 1997).

The star Lalande 21185's outer planet is believed to be 11 AU distance and has an orbital period of 30 years? The problem is that Lalande 21185 is an M_2V star which is only 40% as massive as our star.

If Saturn in our system is 9.54 AU distant and has a period of 29.46 years, it is logical that for a star of two-fifths mass as ours, a planet orbiting 11 AU in its system must take far longer than 30 years.

Please tell me if I'm right.

PETER T. SHANLEY

Chicago, IL

Yep, you're right—according to my ballpark estimate, the period for the outer planet should be more like 60 years. Sorry about the typo, and thanks for catching it.

Dear *Analog*,

I read F. Gwynplaine MacIntyre's story today and was a bit concerned about one point ("Teeny-Tiny Techno-Tactics," March 1997 *Analog*). His characters stink. As a chemist who has had a long (and extremely smelly) familiarity with alkanethiols, I can testify that the story would also have stunk. I wouldn't base a nanobot on alkanethiols....

Otherwise, a very entertaining story.

JOHN ROBERTS

70621.3462@compuserve.com

The author replies....

Mr. Roberts is indeed correct that alkanethiols have a strong and unpleasant odor. However, the characters in my nanobot story were all employed in the publishing industry. This explains why they were unable to smell the alkanethiols. It is standard policy for all editors, publishers, literary agents, typesetters, and proofreaders to submit to surgical removal of their olfactory receptors. These people spend their days surrounded by stacks of manuscripts which stink to high heaven, and surgical modification is necessary as a defense against the stench.

Plans are currently underway for a special scratch 'n' sniff edition of *Analog*, in which all of the stories will be accompanied by appropriate odors. *Analog* readers will be able to smell the methane atmosphere on Jupiter, inhale the sexual musk of she-aliens in heat, and experience the personal hygiene of cyborgs. We're still working out a few glitches in the technology,

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but we've already got an appropriate slogan: *Try new improved scratch 'n' sniff* Analog*! The magazine that gets up your nose!*

F. GWYNPLAINE MACINTYRE

Dear *Analog*,

In his letter published in the March 1997 issue of *Analog*, Ken Moses states that the "Supreme Court decided that Congress's attempt at censorship of the Internet was unconstitutional." Perhaps Mr. Moses has a time machine at his disposal. As of the time I write this (February 10th), the Supreme Court has yet to rule on the issue; it will hear oral arguments on the question in slightly over one month, in mid-March. The ruling in which the Communications Decency Act was found unconstitutional issues from a three-judge panel of the District Court for the Eastern District of Pennsylvania, not from the Supreme Court. A separate challenge of a different provision has also recently been entered in the District Court for the Northern District of California. *The New York Times* has an excellent compendium of information regarding the Communications Decency Act at http://www.nytimes.com/library/cyber/week/cda-index.html.

SCOTT GOEHRING
scott@poverty.bloomington.in.us

Dear Stan:

Your editorial "Public Versus Private" (April 1997) was a superb summary of principles and observations I've incorporated into my own personal philosophy over the years. I strongly agree with you that even the best general principles aren't absolute, but must be pragmatically modified or limited when dealing with specific problems. It'd be wonderful if there were books which listed principles and rules which worked *infallibly* in *every* situation. "Let's see, public versus private ownership of wilderness lands, that's Public Policy Issue No. 7234. Check the index ... ah, here it is! That falls under Rule No. 324. Now I know *exactly* what to believe and do, and anyone who disagrees is obviously an idiot and/or evil!"

Unfortunately, no such books exist—although, disturbingly, some people seem to think they do. In the real world, the old cliché "there are exceptions to every rule" applies. And sometimes two or more *individually* good principles/rules come into conflict with each other. For example, as you wrote, human freedom is a wonderful thing, and coercing people to do something they don't want to do is, in itself, not wonderful. However, if enough people use that freedom to make decisions which wind up hurting themselves or others, it can lead to tremendous suffering and injustice. And even at the non-moral level of pure efficiency, a society has to choose policies (some of which are truly arbitrary, like driving on the right side of the road) which not all of its citizens will agree with. Even individual freedom is not an absolute right—as valuable as it is, sometimes the public good is *more* valuable. The difficult part, of course, is deciding exactly *when* that occurs—and what's the

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minimum amount of coercion necessary, appropriate, and *feasible* to enforce that decision. Even the most honest, reasonable people can, will, and *should* disagree over that.

The sad fact is, both individuals and societies must of necessity make value judgments about what the "right," best, or "least bad" choices are in particular situations. That's *not* a simple task. Often there just aren't enough hard facts available to make a reasonably reliable decision about what to do, forcing us to extrapolate beyond our data points (with all the uncertainty that entails). And, of course, people often vehemently disagree over what really are "facts"! Using what verified information is available, a thorough knowledge of how people have acted in the past and are likely to act in the future, and applying rigorous logic and the "best" general principles, increases the probability that we'll arrive at the best decision.

But even those powerful methods don't *guarantee* success. Many issues are so complex that no single solution or policy will be the best one for *every* individual in *every* imaginable situation. Sometimes a problem doesn't even *have* an "acceptable" solution—all the available options are terrible, and whichever one is chosen will cause significant harm. At the level of society as a whole, the best you can do is come up with solutions which *on average* produce the maximum amount of good for the most people and the minimal amount of damage.

As adults, we have the responsibility to learn as much as we can, and devote our strongest "good faith" efforts to reasoning out what's the "right" thing to do regarding particular issues and situations. That's a tough, demanding job. Inevitably, no matter how hard we try, sometimes we'll make the wrong decisions. But if we become lazy, turning off our brains and blindly relying on dogmatic rules (even the finest ones) to solve problems, odds are we'll be wrong a hell of a lot *more* often.

HENRY G. STRATMANN

Dear Dr. Schmidt:

I am writing to tell you that I agree with your philosophy as expounded in the April editorial "Public Versus Private," and to provide another example of a situation where government intervention is desirable. When I was an undergraduate in Chemical Engineering in the early 1950s, the paper industry was expending a substantial amount of their research money on ways to reduce pollution. None of the techniques developed were implemented unless there was a clear economic return, because the companies feared they would be at a competitive disadvantage and lose business or profitability. Thus, the only way known technology to reduce pollution was implemented was for the government to mandate its application for the whole industry. Of course, in the present political atmosphere, many consumers are willing to pay a premium for something advertised as beneficial to the environment. This can lead to a whole new set of abuses, but that is another subject.

Thank you for a great magazine; I have been a regular reader for nearly

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50 years, and a subscriber for most of that time.

CURTIS A. YOUNTS

Sebastopol, CA

Dear Dr. Schmidt:

Your comments in the April 1997 *Analog* editorial, "Public versus Private," have spurred me to reply. Here's my take on the matter: Mass privatization of government services and assets is a disaster waiting to happen. No one, no matter how convincing his arguments or his proof, will ever convince me that organizations sacrificing chickens to the "bottom line" will be able to provide services with our best interests (and future) in mind. And anyone who thinks privatization is the answer to all our problems is, in my opinion, not living in the same America I am. People who think that thousands of years of human social and psychological evolution can be relegated by economic competition through privatization need merely prop their eyes open with toothpicks and look real hard at the truth. Privatization is just another name for Beelzebub.

I work for a government-funded computer software development firm, and I know that the US government is the biggest, porkiest cash cow on the planet. Millions upon millions upon millions of dollars are funneled through my barely 300-person company to develop and design software that may or may not work, and may or may not ever be used. Therein, Dr. Schmidt, lies the problem. The problem is not that government is managing the park system; the problem is its mismanagement of tax dollars and its practice of throwing money into unnecessary pork projects, and not funneling those assets into services that truly need them. If the government would learn how to handle its affairs more like a business, then business wouldn't have to try to run the government.

One other thing: That person who called the space program a "nationalist socialist space program." Why the hell is a guy like this reading a science fiction magazine? Shouldn't he be reading *Flat Earth Times*?

ROBERT E. WATERS

Tangent Magazine Reviewer

Baltimore, MD

Dear Dr. Schmidt,

Your admirable editorial in the April issue made some excellent points. I'd like to add, "The government is best that governs least"—the point being that usually power is most effective when minimally used. This is not commonly a rule of life for those who want to be left alone to do what they want, no matter what others want.

The argument grows from the eternal human problem, that we are individuals, but we are individuals designed as *social* animals surviving for megayears only by cooperation, including trusting each other not to misuse our power over each other (at any moment, I have the power to pick up a rock and beat you over the head with it). A part of our necessary restraint in using power on each other is that in a normal and natural community we are responsive (which is different from responsible) to each

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other. Since we have a feedback from each other reminding us every day not to overdo things, there is no need for an absolute inhibition. Thus, if for any reason an individual is removed from the normal social interaction and its restraining feedback, his behavior to others often becomes unreasonable, unresponsive. One way to put it is that he often becomes egotistical, lacking in empathy and sympathy, perhaps brutal and cruel. American Indians often remark on the white man's lack of feeling for the community. Not surprising, since immigrants to the US have almost all lost touch with their original communities, if they had them, and it is hard to recreate them. Not impossible: I have heard of some small towns that had somehow managed to build real communities; and men in the army often regret the social loss when they have to leave. But generally, in the US and Western Europe, the individual's feeling for community is below a natural level. It is inevitable that many of those individuals will feel that they are entitled to do whatever they damned well please, and anyone who complains can go to hell—if they wish to pollute the water supply, tough; if they want to cut down all the forests, tough. It is hard to persuade such an individual that he is in real human terms defective. The typical abusive response, that we who complain are being "socialist," is merely abusive, not real (for example "socialized medicine" in Britain secures much lower perinatal and infant death rates than in the US; banking laws in the US are in some ways more "socialized" than in Europe, because the banks can make more profits that way).

Capitalism, in so far as it works, works because we recognize that there is no limit to the ingenuity of some individuals in devising ways to screw the rest of us, and every so often we pass laws against some of the latest ingenuities. Communism failed, among other reasons, because the Party was defined as the source of all goodness for the people, and there was no constitutional or legal mechanism to recognize that Party officials could be as dishonest and abusive as any capitalists, and therefore the abuses went uncorrected unless someone with greater power took personal offense. Those in the US who want the limiting laws relaxed are therefore sometimes asking for a "more Communist" state (I do not say "more Marxist").

RODERICK REES

Woodinville, WA ■

All good Physics is potential Engineering.

—Herman Bondi

(Submitted by Max Hammerton)

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UPCOMING EVENTS Anthony Lewis

30 October–2 November 1997
BOUCHERCON '97 (28th World Mystery Convention) at Monterey Convention Center, Monterey, Calif. Guest of Honor—Sara Paretsky; TM—Julie Smith; Lifetime Achievement—Donald Westlake; Fan Guest of Honor—Cap'n Bob Napier. Registration—$100 attending, $30 supporting. Info: Bouchercon '97, Post Office Box 26114, San Francisco, CA 94126-6114. Email: bchrcon@aol.com Web Page: http://users.aol.com/bchrcon97index.htm

30 October–2 November 1997
1997 WORLD FANTASY CONVENTION at International. Hotel, London, England. Guests of Honour—Iain Sinclair & Joan Aiken; Artist Guest of Honour—Bob Eggleton; Special Guests—Hugh B. Cave & R. Chetwynd-Hayes; Special Media Guest—Doug Bradley; MC—Robert Holdstock. Registration—$160 (100) attending, $50 (30) supporting. Registration limited to 750. Info: World Fantasy Convention, Post Office Box 31, Whitby, North Yorkshire, YO22 4YL, England. Web Page: http://www.farrsite.com/wfc/wfc4.htm

14–16 November 1997
PHILCON '97 (Philadelphia area SF conference) at Adam's Mark Hotel, Philadelphia, Penna. Principal Speaker—Frederik Pohl; Artist Guest—Tom Kidd; Special Guests—Joan D. Vinge and Terry Bisson. Registration—$35 until 15 October 1997, $40 at the door. Info: [checks payable to Philadelphia Science Fiction Society] Philcon '97, PO Box 8303, Philadelphia, PA 19101-8303. Email: philcon@ netaxs.com URL: http://www.netaxs.com/~philcon/

5–9 August 1998
BUCCONEER (56th World Science Fiction Convention) at Baltimore Convention Center and nearby hotels, Baltimore, Md. Guests of Honor—C. J. Cherryh, Milton A. Rothman, Stanley Schmidt, and Michael Whelan; TM—Charles Sheffield. Registration until 30 September 1997-$110 (80);supporting $30 (22); children +4 to +12 $55 (40), children -0.75 to +4.0 FREE (all ages as of 5 August 1998). This is the SF universe's annual get-together. Professionals and readers from all over the world will be in attendance. Talks, panels, films, fancy dress competition—the works. Info: Bucconeer, Post Office Box 314, Annapolis Junction, MD 20701. Email: baltimore98@access.digex.net Web page: http://www.access.digex.net/~balt98

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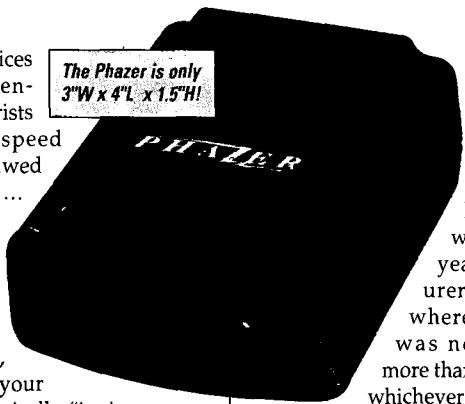

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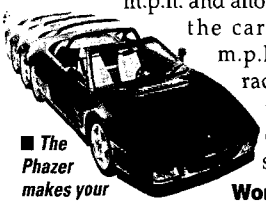

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